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DO THE STATISTICS OF THE CONCENTRATION OF WEALTH IN THE UNITED STATES MEAN WHAT THEY ARE COMMONLY ASSUMED TO MEAN?*

By Allyn A. Young, *Cornell University.*

As I begin, I can imagine the critic asking: "But precisely *what* are the statistics of the concentration of wealth in the United States commonly assumed to mean? And where are these statistics and what are they?" Now although the title of this paper is not of my own phrasing, I am willing, if needs be, to defend it. We are a long way, of course, from knowing at all accurately just how property and incomes are distributed among the 21,000,000 or more families in this country. We do not even know whether the average family income is as low as $1200 or as high as $1600. We are not sure whether the share of the aggregate national income going to the richest 2 per cent. of our families is more nearly a fourth, or a fifth, or a sixth of the total. The poorest half of our families may possibly get a fourth or perhaps three tenths of the national dividend—just what the proportion may be is uncertain.

The picture is blurred, but its general outlines are nevertheless unmistakable. We are reasonably certain that such full knowledge as we might gain from a complete and accurate census of incomes would merely give precision and definiteness to our impressions. There would be, we are confident, no general upsetting of the notions we have already formed with respect to the state of things. Yet, this being so, the wonder is that most of us seem to accept the situation with a

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large measure of complacency. If it is true that the richest 10 per cent. of our families get a third, or anything like a third, of the national dividend, and that the poorest fourth get incomes of less than $600, or at most, less than $700 per family, it might seem that we should not have to look further for an overwhelming indictment of our present economic system. Facts like these, some persons allege, must spell revolution.

Very likely we sometimes find it easy to push these troublesome statistics aside, saying to ourselves that viewing matters relatively, rather than absolutely, conditions are not so bad. Greater inequalities than these have existed in other times and other countries. Despite the relatively high average family income in the United States, incomes seem to be distributed here with rather less inequality than in some of the other great industrial nations. In Europe one must go to the relatively poorer nations, somewhere back of the first rank in industrial advancement, to find incomes that we can say with any certainty are apportioned more evenly than incomes in the United States. But this is evading the issue. If our economic life is diseased, it is small comfort to know that the disease is world-spread. And are we ready to admit our willingness to submit the account of our own social and economic state for comparison on even terms with the reports from older countries? Has much of our talk about democracy, equality of opportunity, and "a fair field and no favor" been idle? Is it for nothing that men from the old countries have built up a new civilization here, leaving behind them, as they thought, most of the handicaps of inherited privilege, of class distinctions, and of a long accumulation of economic advantages, unevenly distributed? Or is there something to be pondered in Mr. H. G. Wells' observation: "Mr. Britling could explain away the faults of England readily enough. . . . But there in America was the old race, without crown or church or international embarrassment, and it was still falling short of splendid"?

If wealth were unmistakably more concentrated here than elsewhere in the world, we should, very likely, be more alarmed about the situation than we now seem to be. But there are other things beside downright obtuseness and an easy satis-

faction with our standing relative to other nations that may affect our attitude. In particular, I suggest the sharp edge of these facts is blunted by the following considerations: (1) The picture they give is that of a cross-section of a changing, shifting current rather than of anything that might be interpreted as a definite and final outcome of forces now at work. (2) The meaning of inequality or concentration in the distribution of wealth and incomes is itself a matter of much uncertainty. (3) It is probable that complete and accurate statistics of the general sort that have already been used would still leave out of account some of the most pertinent facts. (4) Although we know that there is a high degree of inequality in the distribution of wealth, and although we know something of the general outlines of this distribution, the margin of uncertainty with respect to the facts is, nevertheless, so great that they have little compelling power. I shall discuss these points in order.

I.

One does not have to shut one's eyes to the gravity of the immediately pressing problems growing out of the unequal distribution of wealth in order to maintain that things are not so radically wrong as they may seem to be. One may retain a large measure of confidence in the fundamental wholesomeness of a competitively-ordered society, and yet concede the concrete injustice of existing conditions.

During the last one hundred and fifty years the production of wealth has grown faster than the population. And new productive methods, new kinds of wealth, new forms of business organization, have followed, one upon another, in rapid succession. There are few varieties of income which can be expected to keep pace, year after year, with this process of restless change. In a dynamic society more is produced than has to be imputed, in the form of earned income, to the efforts of the rank and file of the productive army. Economic progress yields what is, for the time being, a disposable surplus. The shares in this surplus are the principal stakes in the great game of business enterprise. Here are the roots of some of the most striking phenomena of the concentration of wealth, and here there are the widest disparities between service and

rewards. There are prizes here for efficiency, for alertness, for foresightedness, and for luck and for unscrupulousness as well. Here are the chief sources of the gains of monopoly, of financial manipulations, and of strategic competitive advantages. Here are found most of those capitalized income-yielding opportunities which we know under such names as franchise values, corporate excess, and good will. The fruits of progress are not at first apportioned equally among all the coöperating producers, nor do they go, in major part, to the pioneers of science and industry who have made the largest effective contributions to the knowledge that makes progress possible. They go, rather, to those who actively and successfully contend for them.

But there comes, out of it all, increased demands for labor, for savings, and for productive agents of all kinds. Unless the supply of some productive agent is increasing with undue rapidity nothing can prevent it, as the volume of output grows, from commanding a higher price in the market. Monopoly may crumble and other business advantages may be snatched away by competition, but the forces working toward the diffusion of the product operate relentlessly and surely. Every bit of ground gained by the rank and file is tenaciously held, and becomes a starting point for yet further progress.

This impressionistic picture of an economic process must, for present purposes, stand without the support of a detailed analysis. But it is, I believe, in essential harmony with the doctrines of most of the schools of economic theory. Its relation to the interpretation of statistics of the distribution of incomes and of property must be fairly apparent. Such statistics give a cross-section view of things; they speak for a given year or a given moment of time. But the operation of economic forces is not thus synchronized. The concentration of wealth that exists at any one time in a progressive society is in part an outcome of the fact that the productive army does not advance in even formation in its attacks upon the new sources of wealth. There is an advance guard and there are laggards and stragglers. No one knows just how far the concentration of wealth could be reduced, just how far the forces tending toward diffusion would operate effectively, if economic

progress should cease, if our dynamic society should crystallize into a static state. But that distribution would be much evener seems fairly certain. The concentration of wealth is in part one of the unwholesome fruits of progress. If concentration and diffusion are processes going on simultaneously, statistics show us merely the extent to which, at any one time, the forces making for concentration are ahead of the forces making for diffusion.

It may be objected that this is to no purpose, or at any rate beside the main point, that present inequalities in the distribution of wealth and the social problems growing out of them are none the less real. It is, of course, small comfort to those who are getting less than their fair share of the present product, to know that they or their successors are likely to get more, particularly if along with this assurance there goes the probability that new inequalities are to be built up about as fast as the old ones are leveled down.

Now it is perfectly true that to impute these inequalities to one cause rather than another does not lessen their gravity. But the right diagnosis of a disease does have an important bearing upon the choice of remedies. And so the right interpretation of the statistics of the concentration of wealth must strengthen the convictions of those of us who are opposed to anything like an arbitrary leveling down of fortunes or a revolutionary change in the general structure of our economic life. It must give us confidence that we are on the right road in our efforts to control monopoly, to restrict some of the abuses of corporation finance, to do away with unfair privileges and advantages, to establish and enforce fairer standards of competition, to strengthen the bargaining power of the weaker, to reduce the extent to which accrued inequalities are transmitted from one generation to another by inheritance, and, by controlling immigration, to check the tendency of the process of diffusion to become a process of dilution. It may well be that this road is longer and has more turnings than we now imagine. But there is nothing in what we now know about the distribution of wealth to suggest that this road—the road toward equality of competitive opportunity—is not the right one.

II.

I pass to a more technical question. What is the precise meaning of the concentration of wealth? By what standards shall we measure it? In general, I think, statisticians have been accustomed to use "concentration of wealth" and "inequality in the distribution of wealth" as loosely interchangeable terms. Now any departure from perfect equality in the distribution of wealth means *inequality*. But is *concentration* to be defined so broadly as this? Wealth might be distributed unequally, without there being any amassing or concentration of any relatively large part of it in the hands of any one group or portion of society. Concentration means, then, a particular kind of inequality in distribution. And while, statistically speaking, any perceptible degree of centralization must be deemed concentration, yet the social problem of the "concentration of wealth" is very certainly the problem of its undue or excessive concentration. But we have no definite standard of what constitutes justifiable, permissible, or normal concentration. And so the statistics are made to indicate merely the gross departure from a condition of absolute equality in distribution. One has to be on one's guard, therefore, against imputing to them a significance which possibly they may not have.

There ought to be agreement, it would seem, about what constitutes *equality* in the distribution of wealth. Pareto's interpretation of the meaning of his own well known index of inequality in the distribution of incomes is based on the expressed assumption that when the number of persons with incomes of less than a given size increases relatively to the number of persons with higher incomes, the inequality of income distribution diminishes. I do not quarrel, as some have, with this definition of relative equality and relative inequality in distribution. Given a definite income range, with small incomes more numerous than large incomes, Pareto's hypothesis is in general consistent with the common notion of the meaning of equality in distribution. But, so far as I know, it has not been noticed even by his critics that Pareto, brilliant mathematician that he is, made a curious slip in interpreting the relation of his index to his definition of inequality. His

index does not increase, as he supposed, with what he deemed inequality in the distribution of incomes, but decreases. It can be used, as Benini and Bresciani have used it, in this inverted fashion. At best, however, it is a poor index, being merely a rough measure of the evenness with which income receivers are distributed through the income range. It gives no simple and definite standard of comparison. The index becomes unity, for example, when the relative numbers of the persons receiving incomes of stated sizes are inversely proportional to the squares of their incomes. How far, in general, the notion of an even distribution of income receivers throughout an income range differs from the common notion of equality in income distribution may be inferred from the fact that, with an absolutely even distribution of income receivers over any income range, the richest fourth of the population would get seven sixteenths of the total income, while the poorest fourth would get but one sixteenth.

For the most part, however, equality of distribution is interpreted literally; that is, it is taken to mean absolute uniformity in the distribution of income. Thus, when a statistician throws his estimates into the familiar form that assigns a certain (large) proportion of the aggregate income to a certain (small) proportion of families, the comparison inevitably implied is with a state of things in which 50 per cent. of the families get exactly 50 per cent. of the aggregate income and 10 per cent. of the families get 10 per cent. of the income. And so with Dr. Lorenz's graphic device for representing the way in which such proportions depart from the line of absolutely equal distribution. So, too, with the index of concentration which Professor Corrado Gini has suggested as a substitute for Pareto's, but which increases when Pareto's decreases, and which becomes unity when one income receiver gets just as much income as another. So also with Gini's other index, which takes into account the sum of the differences between each income and every other income. This index, it is interesting to note, may be interpreted as a summary arithmetical expression of the degree of concentration denoted by the Lorenz graph. So, finally, with all of those measures, such as the average deviation, probable error, and standard deviation, which indicate in a

general way the extent to which incomes as a whole differ from the average income. The significant thing is that all of these ways of expressing the degree of inequality in the distribution of wealth use as a standard or reference of comparison an absolutely equal and uniform distribution.

Some or all of these measures are useful in comparing the distribution of wealth in different countries or at different periods. But none of them is of much help in forming a judgment with reference to the degree of undue or excessive concentration that may exist. The degree of departure from absolute equality, however measured or stated, must itself be referred, if not explicitly, then in some vague way, to a standard of normal or justifiable concentration. A dead level of uniformity is neither practicable nor desirable as an ideal of distributive justice.

A concrete example may give point to this consideration. Suppose that incomes in an imaginary society were distributed symmetrically around the modal or most common income, in the form of a normal frequency distribution. This might represent either one of two things: (1) A normal distribution of ability and a perfect proportioning of income to ability; (2) a random or chance distribution of incomes, under the influence of complex but unbiased forces. This second condition would be consistent with the existence of real equality of opportunity, broadly understood, coupled with the presence of a myriad of small circumstances that might deflect one towards a lower or a higher portion of the income range. Now suppose that the average family income is $1500 and that half of the families get incomes that are within $200 of this average. Under such conditions the richer half of the families would get 58 per cent. of the aggregate income and the poorer half would get 42 per cent. Increase the dispersion of the distribution somewhat, so that half of the incomes are between $1000 and $2000. Then 70 per cent. of the aggregate income would go to the richer half of the population, and 30 per cent. to the poorer half. Increase the limits between which half of the incomes fall to $800 and $2200, and the portion of the aggregate income assigned to the richer half of the population becomes 78 per cent., leaving 22 per cent. for the poorer half.

I do not think that Dr. King's recent estimates err in the direction of underestimating the present inequality in the distribution of incomes in the United States. He assigns about 27 per cent. of the aggregate income to the poorer half of the families and 73 per cent. to the richer half. But this is a slightly smaller degree of concentration than would be given by a normal frequency distribution, with half of the incomes falling between $900 and $2100. This suggests that no simple or general statement of the degree of concentration can give, by itself, an adequate notion of the extent to which the existing distribution of wealth has to be deemed unsatisfactory. And instead of tabulating the statistics in the misleading form of the proportions of aggregate income or property in the hands of stated proportions of the population, it is better to use a simple frequency distribution, showing the relative numbers of income receivers or property owners in the different income or property classes. Such frequency distributions can be adequately described and compared, one with another, and with various ideal schemes of distribution by the use of the constants devised by Pearson for measuring their spread, skewness, and curvature. Such a handling of income statistics serves to focus attention upon the really important things, which are the upper and lower limits of the income scale and the manner in which income receivers are distributed between these limits. The *amount* of concentration, the amount of departure of a condition of uniform incomes, does not matter so much as does the particular *form* of the income distribution underlying the concentration. An identical general degree of concentration may result from a fairly good and a very bad distribution of incomes.

The worst thing in the present situation is undoubtedly the extreme skewness of the income frequency curve. The mode —the most common income magnitude—is very close to the lower limit of the distribution. Then the income curve descends rapidly as the higher incomes classes are brought under review, reaching a condition of relative attenuation at incomes of only a few thousand dollars, but stretching on for an absurdly great distance before the maximum incomes are reached. The problem of poverty and the problem of great fortunes

are the problems of the lower and upper limits of this income curve. But, seen rightly, the problem of great fortunes is only part of the larger problem of the general skewness of the curve, the problem, that is, of the extremely small average differences in the incomes of persons in the lower part of the income range and the unduly rapid increase of these average differences as the view is shifted to successively higher income groups. Put concretely, that 10 per cent. of the families in the country get possibly three fifths or two thirds of the aggregate income ceases to appear principally as a problem of large fortunes, when it is realized that to include the richer 10 per cent. of the families, one has to go down to somewhere between the $1200 and $1800 income levels. The most serious aspect of the distribution of property and incomes in this and other countries is not the presence of a larger or smaller degree of "concentration," but the general distortion of the whole income scheme, reflecting as it undoubtedly does the presence of a high degree of inequality in the distribution of opportunity.

III.

I do not propose to discuss here the meaning and proper interpretation of all of the various available or possible sources of information respecting the distribution of property and incomes. Some of these matters, I understand, are to be dealt with by Dr. King in the paper which is to follow. Nor can I stop to attack the difficult general problems of the proper definition of wealth and of income for the purpose in hand. But I want to mention two points which seem to me to have an important bearing upon the degree of inequality in distribution shown by the statistics.

In the first place, what disposition shall be made in income statistics of the appreciation and depreciation of capital values? I do not refer here to such appreciation and depreciation as comes from improvements and betterments on the one hand and wear and tear on the other, but to the changing money value of unchanged things. These changing capital values, it is true, are in large measure a result of changes in the probable future income-yielding power of the things valued. But it does not follow that to count appreciation as income involves

double counting. If savings are to be counted as income, and I believe that they must be, for the purposes of income statistics, appreciation in the money value of income-yielding goods or rights, being closely akin to savings in a number of important respects, must also be counted as income. It is no part of the annual product, properly defined, but it is part of the annual *distribuendum*. It enters into the annual changes in the relative economic positions of the different members of society. Any one income receiver can convert his share, if he wishes, into money income and then into real income. It is impossible and, I think, not at all necessary to distinguish between such appreciation as merely records the shrinkage in the purchasing power of the dollar and such appreciation as comes in other ways. So long as appreciation, of whatever sort, is distributed in other manner than in proportion to the other elements in current incomes, it has to be taken into account in income statistics, or at least in the interpretation of the significance of such statistics.

The census estimate of national wealth for 1912 exceeds the similar estimate for 1900 by about $100,000,000,000. Some of this—I doubt that it is more than a third—represents an increase in the national inventory measured in terms of physical units, together with the increase in the unit value of short-lived equipment and products—the current assets of the nation. The balance of this increase consists very largely of net appreciation in the value of land and other durable forms of wealth. And there is an enormous amount in franchise values, monopoly rights, and good will and other vendible competitive advantages that does not enter into the statement. Altogether, it is likely that the recent average annual addition to the national *distribuendum* on account of net appreciation has amounted to as much as $5,000,000,000 and possibly as much as $7,000,000,000, making a difference of perhaps 20 or 25 per cent. in the national income statement.

One of the defects of British income statistics is that they do not cover gains from increases in capital values, even when these gains are realized in actual sales, except where speculation is carried on as a business. Now the effect of the inclusion of these items upon the apparent degree of inequality in the

distribution of incomes will depend very largely upon whether they are counted as income only when realized by actual sale or set down yearly as accruals. Take the case of a farmer who bought a 100-acre farm 10 years ago. Since then it has been increasing in money value, as many farm lands have, at the rate of $2 per acre per year. He now sells it with a gain of $2000. If all of this profit is set down as income for this year, it lifts him, for the once, into the higher income groups and increases the general skewness of the distribution of incomes for the year. But if accruals had been counted at the rate of $200 a year for 10 years the increase would have been unlikely to have carried him up above the average income for the country. In fact, the skewness of income distribution might very possibly have been reduced. Moreover, if there were 1,000,000 other farmers similarly conditioned, there would be the choice between counting 1,000,000 moderate gains or an average of perhaps 100,000 large gains annually. And so with those enormous increases in the values of business equities which have been a very important source of large fortunes, the method of accruals will increase the skewness of the income curve very much less than will the method of realized sales. For the purposes of income statistics there can be little doubt that the method of accruals should be preferred. To wait until the farmer's increased land values are realized in sales exaggerates the farmer's real position in the income scale in one year out of the 10 and understates it the other 9 years.

My other point relates to the statistics of the distribution of property. The most important facts that we have, and the ones most frequently quoted, have been gleaned from probate records. I confess that I have little confidence in the inferences that have been drawn from these figures. The principal difficulty is the difference between the age distribution of decedents and the age distribution of the living population. In England, for example, while the average age at death of that part of the population which lives to be at least 20 years old is over 60 years, the average age of living persons over 20 is about 40. Now as men grow older they often grow richer, and this fact has been shown by Mr. Bernard Mallett to have a very important bearing upon the proportion which the value of the

estates annually passing from one generation to another makes of the aggregate capital value of the national wealth. For example, in the fiscal year 1913–14, the average value of the taxable estates left by persons dying in that year was £4150. But those dying at between 25 and 35 years of age left estates of an average value of only £1600. The average values of the estates which had been accumulated by persons dying between the ages of 65 and 75 was nearly £4200, while persons who lived to be more than 75 left estates with an average value of over £6000. In the United States, where fewer persons start with the initial advantage of inherited wealth, these differences are likely to be considerably greater. Now the danger is not that the probate records will give us an exaggerated idea of the aggregate money value of property holdings, for we have other and better sources of information on this point. But as used by Dr. Spahr and even as used by so careful and competent a student as Dr. King, they give an impression of a higher degree of inequality in the distribution of property than really exists. Not only do many men grow richer as they grow older, but some men grow rich faster than others, while some men, especially among those with little property, grow poorer as they grow older. It follows that the inequality of possessions among persons at the end of life must be very much greater than among the living population. Statistics of the sizes of estates admitted to probate are nearly worthless unless they are accompanied by statistics of the ages of the decedents. And with the probate statistics thrown out of court, there remains virtually nothing that gives us any adequate notion of the distribution of accumulated wealth in the United States.

IV.

Without knowledge of the way in which the ownership of property is distributed, with our income statistics largely guesswork and their meaning and significance uncertain, we have naturally set the problem of the personal distribution of wealth in terms of the things we could see and be certain of: enormous fortunes at one extreme, a great mass of workers near the poverty line at the other. Right though we be in taking these things seriously, we should hardly be willing to rest content

with a social program made up of anti-monopoly laws, inheritance taxation, and labor legislation, and a philosophy of economic reform compounded of philanthropy, of an avowed faith in industrial democracy, and of an attitude of jealous aggression toward great riches. As economists we are interested, or ought to be interested, in knowing whether the present economic scheme is bound to end in disaster, whether, with a little patching, it can be made to get along, or whether its essential principles need to be safeguarded and maintained by giving a new meaning and a new emphasis to real equality of competitive opportunity. In no other way could so much light be thrown upon this fundamental problem as by a thoroughgoing and authoritative study of the actual distribution of property and incomes. We lack satisfactory methods of analysis and interpretation, but most of all we lack the facts. General impressions will not suffice; in matters like this we are right in deferring judgment until we know, and know accurately. It is not a matter of the extremes of the income scale, but of the whole range. In statistics the undistributed middle is prone to be quite as dangerous as in logic. For the study of actual present tendencies the analysis of middle-class incomes is fundamentally important. It is one thing to explain the causes of poverty or the causes of large fortunes: it is another thing to know just how sound our economic life is at its core.

The task is much too large for any individual scholar. The first step is to secure adequate sources of information. With income taxes just coming into importance as sources of federal and state revenues, is the time not ripe for the economists and statisticians of the country to make a statement as to precisely what information they want and why they want it?

DESIRABLE ADDITIONS TO STATISTICAL DATA ON WEALTH AND INCOME.*

By Willford I. King, Ph.D., *Assistant Professor of Statistics, University of Wisconsin.*

I.

The General Characteristics of Available Statistics. As soon as one essays the task of analyzing existing information concerning American wealth and income and their distribution, he is quickly faced by the fact that, in almost every instance, the data are strikingly incomplete. But this scantiness of desired figures does not come to pass because of any shortage in the effort which has been expended in the collection of statistics. My limited experience has convinced me that there is no subject under the sun concerning which facts have not been tabulated. Should you desire to know the number of grains of sand in the sea-bottom, the number of salmon caught in the Columbia, or the number of "suckers" caught by "blue-sky" corporations, the figures have been computed. If you are curious to ascertain how many days' labor it took to build the pyramids, how many germs you consumed at this morning's breakfast, or how many times per page Shakespeare used the word "and," rest assured that the data are awaiting your examination. But, as a prominent advertisement used to read, "It is not so much to know the law as to know where to find it," and most of this marvelously varied collection of statistical information is buried far beyond the depths to which catalogues, dictionaries, or bibliographies give the slightest clues.

There is, then, rather a superabundance of statistical, or pseudo-statistical, information reposing in our libraries, but, should we be interested in the problems connected with the wealth and income of the American people, we soon discover that the figures which we desire are not obtainable in any continuous or systematized form. And this may be said without

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in any way disparaging the able officials who have been in charge of the Census and our statistical bureaus. The funds at their disposal are distinctly limited and they can only collect data concerning facts for which they believe the demand is most general. In order to assure continuity, which is such an essential feature if statistics are to prove of value, it is imperative to follow rather closely in the footsteps of one's predecessors, and, hence, the nature of the material gathered is largely determined by the forms outlined many years ago to meet the demands of that day.

Besides, the chief of the Census Bureau or of the statistical office would need the gift of second sight to anticipate the thousand and one ideas which some one or another will attempt to elucidate or demonstrate by the help of the official figures. If a statistical problem of any intricacy is to be solved accurately it is nearly always imperative that the data must be gathered with this specific end in view. If, however, the government collects its figures for this particular purpose they are often too highly specialized to prove of any great utility in answering other questions. Is there any escape from this dilemma?

In so far as it is practicable, it appears that the solution of special problems should be left to private statisticians or organizations and that the government should continue to collect the raw material with which these private investigators begin their researches. But there are some specific problems which are too costly to be undertaken at individual expense and yet, at the same time, are of too great public importance to be left to private initiative. If light is to be thrown upon such questions it must be done principally through governmental assistance, and there appears to be no sufficient reason why this should not be forthcoming.

Our federal Census Bureau has properly devoted itself in most instances to the collection of information of a broad general nature. The other bureaus of the national and state governments sometimes have imitated the Census Bureau in this respect, but sometimes they have gone to the other extreme and have engaged in the most highly detailed investigations in some limited field. This procedure is to be com-

mended although it seems occasionally that some improvements might well be made in the selection of the special problems. Whenever it is deemed advisable to enter such narrow fields, it is desirable that the problems to be solved should be those in which large numbers of people are interested or those which vitally concern the national welfare.

The federal and state bureaus of labor present hundreds of volumes of figures concerning the wages of laborers, the extent of unemployment, and the prices of various articles, but should you attempt to find a continuous and comparative record in any governmental document showing whether the price per hour of labor is advancing faster for farm hands or for miners, for railway employees or for clerks in stores, you would seek in vain. Should you desire to know whether the price of house rents tends to keep pace with the price of food, information would prove most scanty. Should you hope to ascertain whether union men or non-union men were more frequently unemployed, you would be disappointed.

A tremendous amount of effort has been expended in studying questions of merely local or temporary interest and very little headway has been made in coördinating these scattered endeavors, uniting the results, and presenting them to the public in a simple and intelligible form. For example, the United States Bureau of Labor Statistics collects data on wages in the manufacturing field; so does the Census; so do the labor bureaus of some of the states. At the same time, it is most difficult to find any continuous records of the wages of miners, farm hands, clerks, domestic servants, and other very numerous and important classes of workers. In some instances, wages are given by the hour, in some by the day, in some by the week, and occasionally by the month or year; but only rarely are we informed as to the average number of hours worked in any of the longer periods, hence accurate comparison is manifestly impossible.

According to my, perhaps, archaic views, energy too frequently has been expended in trying to demonstrate perfectly obvious facts. We all know from common observation that many men receive such low wages that they cannot support their families in comfort. It is also perfectly evident that the

poorer families spend their *entire* income for something—and these facts are apparently the leading ones that have been developed by many of the recent budgetary studies. The difficulty seems to be that many specialized inquiries are undertaken without first clearly defining the problem to be solved and, in every such case, the usefulness of the results is likely to approach zero.

It is probably too iridescent a dream to ever attain reality, but it would certainly be most helpful if the collection of all statistics of a given type might be centralized in some one bureau and published in standardized form from month to month and year to year. Before beginning operations, this bureau should devote very much time and energy to ascertaining exactly what problems scientific men believed most in need of elucidation and, having formulated these problems in the most exact fashion, it would then be the work of the statisticians to devise ways and means of solving them. It would seem that the talent of both of the Associations here represented might very well be utilized in framing the new topics of investigation upon which they believe further knowledge is most vital and in devising ways and means for attaining this end.

I shall take the liberty now of suggesting certain fields of inquiry which seem fertile and yet inadequately tilled at the present time.

II.

Wealth and Its Distribution. One query to which it seems that a more exact answer is generally desired is: How is wealth distributed among American families and how is this distribution changing?

The Massachusetts studies of estates throw most interesting light upon this question. Studies from probate records are necessarily limited in scope because they show wealth only at the termination of life and because the estates of the greater share of decedents are never probated. The latter is, of course, the much more serious defect. But neither of these objections seriously affects the usefulness of such data as a gauge of *changes* in distribution. A quarter of a century has elapsed, however, since the last period reported upon by the

Massachusetts Bureau and it would certainly seem worth while to have the series of comparisons, so admirably begun, brought down to date. Similar investigations in New York and a few sample states in other sections of the country would doubtless add most valuable information.

The tax rolls are the basis of existing Census figures concerning the aggregate value of the wealth of the people of the United States. The attempt to adapt to this purpose the valuations set by assessors is always destined to meet with only partial success. Values for purposes of taxation are habitually underestimated. The plan of correcting this underestimation by dividing by some assumed ratio of assessed to true value will always be a crude method at best. In most communities, this ratio has never been worked out, and, in but few places, is it determined with even a reasonable approach to accuracy.

Another serious objection to using local tax reports as a basis of wealth estimation is that it is usually impossible to obtain therefrom any idea whatever of the distribution of property among families or individuals. Taxes are collected, not as a basis for statistical information, but in order to obtain funds, and, hence, the local or state authorities take little account of anything but totals. For these two reasons, therefore, it appears that any adequate statistics of existing wealth distribution must be obtained through the ordinary schedules of the Decennial Census. Errors from inquiries of this nature will doubtless be very numerous but they will tend to be compensating. Many men, because of habitual secrecy and reticence concerning their business affairs will report their assets far below normal. Others, however, will exaggerate in order to magnify their own importance. As to which instances will occur more frequently, it is hard to say but, at any rate, there will be a noticeable tendency for errors to cancel out. The same facts would be true as regards reported liabilities though the tendency in this case would presumably be stronger to under- than to over-estimation.

The first step in the Census inquiry would be the drafting of the best possible question schedule. Much careful study would be needed before the final forms were ready for the printer. The following outline is suggested as a rough tenta-

tive classification of the various categories of wealth belonging to each individual:

I. Assets.
  A. Indirect Natural Resources.
    1. Land.
      a. Farms.
      b. Urban business sites.
      c. Miscellaneous varieties.
    2. Mines.
    3. Miscellaneous.
  B. Transition or Capital Goods.
    1. Buildings.
    2. Machinery and equipment.
    3. Live stock.
    4. Raw materials.
    5. Dealers' stocks.
    6. Miscellaneous.
  C. Direct or Consumption Goods.
    1. Residence and park land.
    2. Houses, hotels, theatres, churches, etc.
    3. Furniture, clothing, jewelry, and miscellaneous.
  D. Claim Goods.
    1. Notes, mortgages, bonds, etc.
    2. Stocks.
    3. Insurance policies—cash surrender value.
    4. Miscellaneous.
II. Liabilities.
  A. Current accounts.
  B. Short term notes.
  C. Bonds and notes secured by mortgage.
  D. Miscellaneous.

Our inhabitants are already required to give much of this information so that the new questions to be added to the schedule would not be numerous. If it is feasible to learn the value of farm land, factories, etc., it likewise seems probable that similar knowledge can be gathered concerning holdings of stocks, bonds, and other securities.

Once the data were collected, the next problem would be their classification on a logical basis. To determine what is logical we must first decide upon the questions which it is most imperative to answer. As previously stated, such a decision as this would seem to be a legitimate function of such organizations as the American Statistical and Economic Associations

and should, of course, be arrived at only after most mature consideration. As topics at least worthy of mention, I would suggest studies of the relationship between the net assets of the family and

a. Size of family.
b. Age of head of family.
c. Race.
d. Nationality.

It may be well to devote a few words to the reasons for each of these classifications.

The first would throw light upon such questions as the following:—

1. Does great wealth mean larger or smaller families?
2. Does a large family necessarily lead to poverty?
3. How does wealth in general tend to vary with the size of the family?

The second classification would help in answering this query:—Do we have a normal tendency in the United States for a man to accumulate property as he grows older? If so, at what rate? Do all classes of the population participate in this tendency?

The third classification would be necessary in order to separate out the white race so as to obtain a fair basis for answering the questions just propounded. It would also be of interest in enabling us to compare the Caucasian and Negro races and, if the inquiry were continued decade after decade, the relative economic progress of whites and blacks might thus be measured with a reasonable degree of accuracy.

The fourth classification, that on the basis of nationality, is one which might be elaborated indefinitely, if funds were adequate, or, on the contrary, it might be confined merely to the comparison of property holdings of those persons who were native born of native fathers, who were native born of foreign fathers, and who were foreign born. This simpler analysis would probably answer the requirements of most investigators and would immensely reduce the extent of tabulation necessary.

Many other classifications and lines of inquiry would doubtless suggest themselves to nearly every economist, and the above are offered only as being among those which would, perhaps, have the widest appeal.

III.

The Aggregate National Income and Its Distribution. A study of wealth distribution is interesting because it deals with the rights of control. Property necessarily means economic power and is ordinarily the key to other kinds of power as well. A man's control over his own time, over his own freedom of movement from place to place, over the activities of other men, over the uses to which goods shall be put, in short over the whole modern system of production varies directly and almost proportionally with the value of the property rights which he possesses. To the ambitious man who believes that leadership is the only worthy goal or to that political scientist who considers governmental control the chief end of human progress, a study of property distribution seems most vital. On the contrary, to those who think more of immediate economic welfare, who are interested in the comforts and conveniences of everyday life, the question of wealth or property may seem of little import. Such persons will naturally turn their attention to the various types of income rather than to wealth.

The kind of income with which people are most vitally concerned is, of course, real or psychic income. Thus far, however, this particular species has successfully defied all attempts at accurate statistical measurement. Apparently, the commensurable phenomenon which most nearly resembles psychic income in the nature of its variations is income in purchasing power and this is merely a calculation of what book or money income would be if the price level never varied. Since, in reality, the price level is always fluctuating, we can only measure income in purchasing power by computing an average index of the prices of things which some designated class of persons actually purchases and then compare the average relative price changes in these commodities with the average relative changes in the book or money incomes of the persons compos-

ing the class in question. In short, we attempt to measure the supply of economic goods available for a given person or class by means of the roundabout device of introducing commensurable money values into both terms of a ratio with the knowledge that the monetary factor will cancel itself and disappear.

If, therefore, we desire to add anything worth while to our existing knowledge concerning income distribution or changes, we can only hope to succeed by improving our data concerning book or money incomes and various kinds of indices of prices.

In the United States, the only available source of information concerning income distribution among the wealthier classes is contained in the reports on the income tax. This is necessarily faulty because of the natural tendency to evade the burden of taxation. The federal law exempts incomes to such an extent as to make it throw light only on the receipts of the relatively wealthy. The Wisconsin law varies the exemption with the size of the family thus making it very difficult to utilize the data. By going back to the original records, Professor Henry M. Trumbower, now a member of the Wisconsin Railroad Commission, was able to regroup the cards in such a way as to show the reported incomes including exemptions. However, since married men with incomes of $1200 or under are not required by the Wisconsin law to file schedules, and since these comprise the majority of heads of families, it is manifestly impossible to arrive at any complete classification. It is not an entirely safe assumption anyway to suppose that Wisconsin fairly represents the other 47 states of the Union in income distribution, even though we know that it is an average state in many respects.

If we now turn to the problem of estimating income distribution among the poorer classes, we find here, likewise, but few accurate indicators. The investigations of the United States Bureau of Labor in 1903, the study by the British Board of Trade in 1908, the wage distribution recorded by the Census of Manufactures in 1905, and numerous but scattered inquiries in narrow fields throw much light upon the subject, but the statistician is nevertheless compelled to make many rather sweeping assumptions on rather slender bases before he can

piece together a curve or table picturing income distribution among working class families.

Still further assumptions and generalizations are necessary before the curve for the working class can be coupled onto that for the well-to-do and rich, thus completing the money income distribution curve for the United States as a whole.

The problem of estimating total income for the people of the nation is relatively more simple, but cannot be accomplished with any high degree of accuracy by use of the existing data. Three separate lines of attack are available: First, the estimation of total consumption; second, the summating of net incomes of all individuals; and third, the calculation of the total annual product. Were these three quantities all computed with accuracy, it is evident that the last two would be nearly identical and that the first would be larger or smaller than the others according to whether the inventory of accumulated goods on hand was diminished or increased during the period considered.

To estimate total consumption, it is necessary to differentiate between goods used directly and goods used indirectly. It is necessary to evaluate the services of durable consumption goods and the direct services of persons. This includes such nice problems as estimating the value of poultry, vegetables, fruit, etc., consumed on farms; the aggregate rental value of residences and the amount spent for entertainment. Such estimates generally consist in little more than assuming as the correct figure the mid-point between possible limits of error.

Total book income for the nation can be estimated with a higher degree of accuracy than can total consumption. The former may be approximated by adding together estimated individual book incomes. Data concerning average wages in different occupations is quite abundant and the Census gives us a fair idea of the average number of persons following each calling. But even this process is not free from difficulties. Laboring families obtain much of their income from property owned, by renting rooms, by keeping boarders, etc. About the only study throwing enough light to be worth mentioning upon these supplementary income sources is the Eighteenth Annual Report of the Bureau of Labor, and this is 13 years

old. It is possible that conditions have changed noticeably during this interval. Add to this difficulty, the presumable underestimation of incomes in the federal and state tax lists of the wealthier classes and also the lack of information concerning the vast numbers of persons, such as farmers and small merchants who are not employees and are still too poor to pay an income tax, and the apparent simplicity of the problem becomes less evident.

The last recourse, then, in attempting to ascertain total national income is to turn to data on production. It is possible to find recorded values for most of the raw material and to trace the various value additions successively until the finished product finally emerges. But even this route is by no means all smooth sailing. We know the value added by manufacture and by transportation, but what about the value added by the great mercantile class? True, data are gradually accumulating concerning the fraction of the final selling price going to remunerate this function of adding time utility to goods but it is still complete in only a few lines. Likewise, the value of product contributed by personal servants, by the use of residences, churches, theatres, public buildings, etc., is nowhere accurately recorded. Yet, with all its defects, this is by far the easiest path to follow.

Would it not, however, be advisable for the Census Bureau to make direct inquiries concerning individual, family, and corporate income? Would it not be advisable to classify this income rather carefully as to source using a classification somewhat like the following:—

NET BOOK INCOME CLASSIFIED AS TO SOURCE.

1. Rent of land.
   a. Farm land.
   b. Mines.
   c. Urban land.
   d. Miscellaneous natural resources.
2. Rent of transition or capital goods.
   a. Business buildings and equipment.
   b. Miscellaneous.
3. Rent of direct or consumption goods, *e. g.*, residences.
4. Income from securities.
   a. Shares in partnerships or corporations.
   b. Notes, bonds, etc.

5. Income from wages or salaries.
6. Net entrepreneurial profits.
   a. Gain or loss in value of assets.
   b. Profits from operation of business.
7. Miscellaneous income.

It would be highly desirable, also, if we could learn something about the annual savings or deficit in the family finances, but it seems improbable that this difficult task could safely be added to the already heavy and intricate burdens of the census enumerator. Some will doubtless affirm that any inquiries concerning income are too inquisitorial to be entrusted to these functionaries with any hope of getting accurate results. The strength of this position is lessened by the fact that the class of people most reticent about their financial affairs have become accustomed to the inquiries connected with the income tax, and inquiries to which people are accustomed are much less likely to arouse their antagonism than are those of an unusual nature. There naturally would be numerous large errors but, as in the case of the study of wealth, these would probably tend to offset each other, since some would report too large and others too small a net income. The analysis of income made by the government for purposes of collecting the income tax would doubtless prove extremely valuable to those devising questions for a census schedule. While it might be necessary to make considerable modifications and alterations, the difficulties and mooted points have, at least, been clearly brought to light.

The income receivers would naturally be divided into individuals, partnerships, and corporations. The individuals ought probably to be reclassified on lines identical with those used for wealth. This plan would have the merit of facilitating comparisons of wealth and income.

IV.

Chronological Changes in Income. So much for the desired data on income which the Census might well attempt to gather in order to clarify the problems of distribution. After such an investigation, we could hope to answer more definitely questions not only concerning distribution among families but also

among the factors of production. These elaborate decennial studies are highly desirable in order, first, to give us a well-established base of operation and, later, to serve as guideposts to prevent us from wandering into paths of error. But, in nearly every field of economic activity, noteworthy fluctuations take place between the Census years. These fluctuations are largely cyclical in their nature and are of such great importance that the government can ill afford to ignore them to the degree which has been done in the past. To study these cyclical movements, we need not decennial, but rather monthly, or at most quarterly, reports. Evidently, this type of study must be carried on by enumerators who are always in the field. For such studies, complete data are not only forbidden by prohibitive expense but are absolutely unnecessary and useless. What is essential, is a collection of samples properly distributed both geographically and industrially.

The sampling for this purpose should be done on the theory of considering each citizen equally important. This means that samples should be collected from each state in proportion to the population; that the urban and rural districts should furnish samples in proportion to the inhabitants residing in each; and that the samples from each industry should be numerous in proportion to the number or workers which the industry employs. Were it not found feasible to apportion the samples in this fashion, the same results might be mathematically obtained by giving to each variety of samples the weights necessary to place all averages upon the basis of numbers of persons.

Stress is here laid upon the apportionment of samples or weights because the continuous statistical studies of the past have been given to overweighting certain classes. It is said that, in the last political campaign, the vision of certain politicians failed to reach beyond the Mississippi. Likewise, the visions of our governmental statisticians have too frequently failed to pass outside the city limits or even outside of certain factory districts. Continuous data concerning wages and hours of labor are confined largely to manufacturing industries and the unionized trades. Unemployment statistics are usually reported for trade unions only. The statistics for the

mines, the railways, and the rural districts are woefully inadequate and are almost incomparable with the results set forth by the federal Bureau of Labor Statistics. There is no intent here to reflect upon the competence of the people in charge of the respective fields of inquiry. They doubtless utilize their time and funds to as good advantage as circumstances permit. The present head of the United States Bureau of Labor Statistics deserves the highest commendation for the immense progress made toward putting the work upon a scientific basis, especially as regards the indices of wholesale prices. The criticism is on the lack of organization which permits different bureaus to gather statistics of similar nature and which allows purely technical positions such as those held by chiefs of statistical bureaus to be classified among the political spoils with the consequent likelihood of quadrennial changes in personnel.

But it is neither necessary nor desirable to discuss further at this time existing statistics. The fruitful thing is to ascertain what new data are really essential for measuring changes in income. Innumerable varieties are desirable which are of greatest importance. Those that seem to me fundamental are as follows:—

I. A General Weighted Price Index to Measure Changes in the Value of Money with sub-index numbers as follows:

- A. Wholesale commodities.
- B. Stocks and bonds.
- C. Real estate, urban and rural.
- D. Rents, urban and rural.
- E. Labor per hour, classified by industries and occupations.
- F. Retail prices.

The data for this general index number should be weighted as nearly as possible in proportion to the volume of transactions in each field, in accordance with the principles laid down by Professor Irving Fisher.

II. The Hours of Labor per Week.

For this purpose all employees should be divided among the same industrial and occupational classes used for ascertaining the price of labor for the general price index described above. With information available concerning the price of labor per

hour and the hours worked per week, we are prepared to tell something concerning the fluctuations in the laborer's income.

III. A Consumer's Index of Prices, sub-divided according to the following classes of consumers:

A. Rich.
B. Upper middle class.
C. Lower middle class.
D. Poor.

The consumers' index should evidently have each article weighted in proportion to the amount thereof consumed by the given class. We have long possessed a satisfactory food index number. Beginnings are being made by the United States Bureau of Labor Statistics in recording the prices for dry goods and fuel. But dry goods are not the only kind of clothing, and price changes in so narrow a field may be far from typical. A large share of the ordinary consumer's budget fails to appear in any governmental price records. So far as the federal retail price indices are concerned, we do not live in houses, wear coats or shoes or hats, use electric lights, go to the theatres or movies, ride on the street cars or railway trains, read newspapers, or pay doctors' bills. In brief, there is no index number in existence which enables us to tell with any reasonable degree of accuracy whether either wages or income in purchasing power are going up or town. The constitution of such an average index number seems to me to be the most vital addition to our continuous statistics needed at the present time.

These figures should not only be gathered for the present but should, in so far as feasible, be carried back into the past. The obstacles to obtaining standard articles to represent each type of expenditures are great but they may be overemphasized. With patience and sufficient appropriations, it seems entirely practicable to present a consumers' index extending back for at least a couple of decades which would be accurate enough for all intents and purposes. After all, most people are not interested in minutiae and a statistician is, in no sense, duty bound to present only figures which are accurate to a high degree. The accountant must make his accounts balance to a cent. The statistician needs only to be sure that his figures

are accurate enough to answer *truthfully* those questions which they purport to answer at all.

IV. Employment, sub-divided under the same industries and occupations used for wages.

This fourth principal record is absolutely essential before we can judge changes in the income conditions of the working classes. It has hitherto been deemed impracticable to collect employment data from the workers themselves. This idea seems largely fallacious. In no other manner, can we ever hope to learn very much concerning lack of work among the unskilled and casual workers,—the classes who probably suffer most severely from this evil. No employer and no trade union secretary can tell us how many weeks these men were out of work during a given month or year.

To determine variations in the income of any part of the wage earning class we must then know four things:

1. The wage rate per hour.
2. The hours of labor per week.
3. The number of weeks employed per year.
4. The relative prices of the commodities purchased.

With these four records complete, we can picture, with a fair degree of accuracy, the changes in working-class income. The fact that there is much income from other sources is fully recognized, but the wage furnishes the only part in which there is marked variation.

It is, moreover, absolutely essential in any study of distribution and price changes to keep separate the above four ideas. To confuse the price of labor, which corresponds fairly closely to the hourly wage, with the daily, weekly, monthly, or annual earnings, all of which are essentially income concepts, is to sound the death knell of all accurate thinking in this field.

My knowledge of the methods used and difficulties involved in collecting this type of data is so meager as compared to that of many members of the American Statistical Association that I hesitate even to make a suggestion along this line, but I have often thought that it might be feasible to collect all of this information by aid of postmen. The city and rural mail-carriers penetrate into nearly every community of the country. They

know the people; they could easily ascertain the facts concerning prices, wages, hours of labor, and employment; they are men of intelligence; they all report to a central authority; why are they not the logical men to gather the needed data? Of course, they should have some slight extra compensation for performing this new task, but the expense involved should be comparatively trivial.

V.

Summary. The ideas which I have attempted to set forth here might be summed up as follows:

First, we need an enumeration of the most important problems to be solved.

Second, the facts deemed necessary to solve these problems should be accurately determined upon. It would be the legitimate function of a joint committee of the American Statistical and Economic Associations to outline both of the above fields in detail.

Third, the present duplication of work in these fields by different state and federal bureaus should be eliminated, all statistical work of this nature being placed under the direction of one central authority.

Fourth, this central bureau should so systematize the work as to give unity and continuity to the entire field. The principal averages of wages, prices, etc. should be presented monthly with a promptness and regularity approaching that which characterizes the appearance of the reports of the Weather Bureau or the index numbers published by financial magazines.

We are fond of boasting of American efficiency, and here seems to be an opportunity of demonstrating our claims in this line by putting into operation some such program as the one just outlined. If successfully executed, this would certainly set far to the front a new standard in the field of wealth and income statistics.

THE CLASSIFICATION OF MENTAL DISEASES IN NEW YORK STATE.*

By Horatio M. Pollock, Ph.D., *Statistician, New York State Hospital Commission.*

The preface of the first edition of the nomenclature of diseases, drawn up by a joint committee appointed by the Royal College of Physicians of London and published in 1869, declares that "for perfecting the statistical registration of diseases, with a view to the discovery of statistical truths concerning their history, nature and phenomena, the want of a generally recognized nomenclature of diseases has been felt as an indispensable condition." Further, that "among the great ends of such a uniform nomenclature must be reckoned that of fixing definitely for all places the things about which medical observation is exercised, and of forming a steady basis upon which medical experience may be safely built."

This committee was discussing the nomenclature of physical diseases, but its observations apply equally well to mental diseases. The lack of a generally accepted classification of mental diseases makes it impossible at the present time to collect comparative data concerning the various forms of mental diseases in different states and countries. In taking the census of the insane in institutions in 1910, the federal Census Bureau found it impracticable to collect data concerning any specific forms of insanity, except the alcoholic psychoses and general paralysis, and the data collected concerning these are in part unreliable.

In New York State, since 1889, four different systems of classification of mental diseases have been used. The first, a modification of the English classification, was used in a perfunctory way, but with no pretense of scientific accuracy, from 1889 to 1902. Then a simplified form of the same classification was introduced, but this was no better applied than the first. In 1905 the new psychiatry was rung in and the old

* Read at the quarterly meeting of the American Statistical Association, New York City, December 14, 1916.

classification was rung out. The process, however, was not joyous. The physicians in the service had had a comfortable time with the old classification. To apply it required but little study of cases, and very few persons thought of comparing the diagnoses of one hospital with those of another. The new classification required study and close observation, and the work done in the hospitals was likely to be checked.

The attitude of these physicians was well shown in the remarks made by Dr. A. E. Macdonald, then superintendent of the Manhattan State Hospital, in his presidential address before the American Medico-Psychological Association in May, 1904. Speaking of matters of importance to the association, he said: "One of these is the perennial question of the classification of insanity, which, often as it has been agitated and pondered, has yet failed of satisfactory adjustment. It is a matter of great regret that some at least working agreement can not be reached, faulty even though it should be, which will enable the alienists of one country to understand the statistics of others, and to apply them by way of comparison to his own. If such a standard *is* to be reached, it would appear to me that it must be through mutual concessions and agreements of practical men, such as compose our own and kindred associations, for I opine that present conditions result from less possible coherent elements: authors and clinicians for example, who have pride in their own classifications, unstable though they be, and are incapable of recognizing possible value in others." He then referred to the history of New York State, and added, referring to the new classification, that "we are threatened with still another revolution, and that in the direction of intricate association of newly discovered or invented forms which promise little in the way of adhesiveness or permanency."

Judging the matter in the light of subsequent history, Doctor Macdonald was a better statistician than psychiatrist. He realized the need of a systematic classification of diseases that would have permanency of character, but evidently had little conception of how such a system was to be devised. In contrast with the standpatters, it is interesting to note the attitude of Dr. Adolf Meyer, one of the so-called "authors and clini-

cians," who, as director of the Psychiatric Institute, formulated the new classification in 1905. Speaking of the system of statistics, which the president of the American Medico-Psychological Association thought was fairly satisfactory, he said: "The present statistics of forms of mental diseases are of very little use. However comparable they may appear, they have merely sham value, as could easily be shown in actual cases, such as in many of manic-depressive insanity, which have figured under no less than the following headings: Acute mania, acute melancholia, chronic mania, chronic melancholia, secondary dementia, paranoia, mania recurrent, melancholia recurrent, and circular insanity, where the same kind of attacks recurred, or on the arbitrary differences which exist in the use of the term paranoic and acute and simple melancholia, etc. between the various hospitals. The hospital physicians do not consider themselves responsible because the system is forced on them and they submit because they have nothing to offer which would be accepted by all."

In discussing the difficulties of classification, he stated that an absolutely clean cut classification is not to be expected, unless the number of groups be made unwieldy, and further explained that improvement in classification would come with the increase of clearly definable facts. Although Doctor Meyer's classification was adopted by the commission in 1905, it was not till 1908 that it was used with any degree of success throughout our state hospital service. During the interim of three years the well recognized organic types were diagnosed and counted, but the remainder were reported under the heading "all other psychoses."

In 1908 the Commission in Lunacy appointed a statistician, and made provision for the reporting by the hospitals of definite statistical data relative to each patient admitted or discharged. Such data included among other things the diagnosis of the mental disease with respect to group and type. Distinction was made between first admissions and readmissions. The per cent. distribution of psychoses in the various hospitals, compiled from the statistical cards submitted for both classes of admissions, has been compared from year to year, and discussions concerning variations have been held at

several quarterly conferences. These reports and discussions have had the effect of making the physicians in the several hospitals cautious in diagnosis, and have compelled close study of the history and mental and physical characteristics of the patients admitted. The excellent results now being obtained, however, would not be possible had it not been for the courses of instruction in psychiatry given to the physicians in the hospital service by Doctors Meyer and Hoch of the Psychiatric Institute. These courses have given physicians in the service clearer conceptions of the new psychiatry, and to some extent at least the same point of view with reference to classification.

In 1915 it was found that the classification in use needed some revision to bring it up to date, and after a conference with the committee on statistics, it was modified by Doctors Hoch and Kirby. At the present time the classification conforms fairly well with the best modern psychiatry.

Doctor Meyer, in making the orginal classification, started with three large groups, viz.:

A. The diseases which depend on a fairly tangible interference with the brain or its nutrition, in the form of some definite brain disease, or some intoxication, or some autotoxic or infective or exhaustive disorder.

B. Disorders which provisionally, and owing to their more or less striking symptomatology, are most interesting from the point of view of *symptomatic equivalents, and course and outcome;* simple excitements and depressions, dementia praecox, paranoic developments, and manic-depressive states.

C. Disorders in which we see the marks of some of the recognized neuroses, hysteria, epilepsy, neurasthenia, psychasthenia, and peculiar make-up; and inbecility and idiocy.

The first large group A, was subdivided into smaller groups; one comprising the definite brain diseases, one the intoxications, and a third, infective and autotoxic disorders.

In the first sub-group the psychoses are closely related to an organic, or at least definite disease, or disturbances of the brain and nervous system. Clinical groups under this subdivision in the classification now in use, are the traumatic psychoses, psychoses with cerebral arteriosclerosis, dementia paralytica,

or general paralysis, psychoses with cerebral syphilis, psychoses with Huntington's chorea, psychoses with brain tumor, and psychoses with other brain or nervous diseases.

The second sub-group, the intoxications, includes the alcoholic, drug and other toxic psychoses. The general group of infective and autotoxic disorders comprises infective-exhaustive psychoses, allied to infective-exhaustive psychoses, and autotoxic psychoses.

The second large group of Doctor Meyer's classification, B, which is generally spoken of as the functional psychoses, includes in our present classification seven clinical groups, viz.: manic-depressive, allied to manic-depressive, involution melancholia, symptomatic depressions, dementia praecox, allied to dementia praecox, and paranoic conditions. Owing to the fact that these clinical groups are not fully understood, classification of borderline cases is exceedingly difficult. Certain cases that do not present the typical symptom-pictures of the more distinct psychoses are placed in the allied groups.

In the third of Doctor Meyer's large groups, C, are now placed the epileptic psychoses, psychoneuroses, psychoses with constitutional inferiority, and psychoses with mental deficiency.

Although Doctor Meyer was a pioneer in the introduction of the new psychiatry in this country, he was successful in introducing a system that has proved its worth during the past eight years in the New York State hospitals. When the advancement of science brings about a marked change in the conception of some forms of mental diseases, our classification will be modified accordingly; in the meantime we have the satisfaction of living up to the light we have.

In the treatment and study of mental diseases, New York State has always been a pioneer. It was first among the states to establish a comprehensive and enforced system of state care of the insane; first to provide separate institutions for the criminal insane; first to establish a scientific institute for research and instruction in psychiatry; first to conduct training schools for nurses in its hospitals for the insane, and first to

establish a bureau of statistics for the systematic study of data relating to insanity.

Other states have followed New York in many things, and it is hoped that its system of collecting scientific data of mental diseases will also be found worthy of general adoption.

I append a copy of the classification now in use, with some explanatory notes prepared by Drs. Meyer, Hoch, and Kirby.

CLASSIFICATION OF MENTAL DISEASES ADOPTED BY THE NEW YORK STATE HOSPITAL COMMISSION SEPTEMBER 22, 1915, TO TAKE EFFECT OCTOBER 1, 1915.

1. *Traumatic psychoses.*

"We should not speak of traumatic psychoses where the trauma is merely a contributory factor in precipitating another definite mental disorder such as general paralysis, manic-depressive insanity, katatonic or paranoic deterioration without specific traumatic stigmata, or where a psychosis follows an injury not involving the brain, through shock, etc." (Meyer.)

The following are the most common clinical forms:

(a) Post-traumatic delirium.
(b) Post-traumatic constitution (irritability, sensitiveness to alcohol, paranoid trends, hysteroid or epileptoid attacks).
(c) Traumatic defect conditions (aphasia, deterioration with epilepsy, mental enfeeblement, etc.).

2. *Senile psychoses.*

The clinical types most frequently met with are the following:

(a) Simple deterioration (of memory, intellectual capacity and interests).
(b) Presbyophrenic type (similar to Korsakow mental complex).
(c) Delirious and confused states.
(d) Depressed and agitated states in addition to the deterioration.
(e) Paranoid states in addition to the deterioration.

3. *Psychoses with cerebral arteriosclerosis.*
4. *Dementia paralytica.*
   (a) Cerebral form (exaggerated knee-jerks).
   (b) Tabetic form (diminished or absent knee-jerks).
5. *Psychoses with cerebral syphilis.*
6. *Psychoses with Huntington's chorea.*
7. *Psychoses with brain tumor.*
8. *Psychoses with other brain or nervous diseases.*

This division provides a place for grouping a variety of more rare mental disorders associated with organic diseases of the nervous system. On the card the special disease must be mentioned after the group name, and this should be followed by a few descriptive terms, characterizing the accompanying mental disturbance.

(a) Cerebral embolus.

(b) Brain abscess.
(c) Tubercular meningitis.
(d) Central neuritis.
(e) Multiple sclerosis.
(f) Tabes dorsalis.
(g) Acute chorea.
(h) Other conditions to be specified.

9. *Alcoholic psychoses.*

Since on the basis of chronic alcoholism a number of fairly characteristic mental disturbances develop, the type of alcoholic psychosis should be indicated in each case. Among these types only "pathological intoxication" seems to require special explanation. By the term "pathological intoxication" is meant a condition which is the *immediate* result of taking a larger or smaller amount of alcohol. The symptom-picture is characterized by special features not seen in ordinary drunkenness.

(a) Pathological intoxication.
(b) Alcoholic deterioration.
(c) Delirium tremens.
(d) Korsakow's disease (polyneuritic psychosis).
(e) Acute hallucinosis.
(f) Chronic hallucinosis.
(g) Acute paranoid form.
(h) Chronic paranoid form.
(i) Other less characteristic symptomatic types should be specified.

10. *Drug and other toxic psychoses.*

(a) Morphinism, cocainism, bromism, chloralism, etc., or combined.
(b) Lead intoxication (several forms are described).
(c) Gas poisoning (delirium or confusion).
(d) Food toxicoses (tea, coffee, ergot, etc.) and pellagra.

11. *Infective-exhaustive psychoses.*

(a) Febrile delirium.
(b) Infection delirium.
(c) Exhaustion delirium (acute confusion, hallucinatory delirium, "amentia").
(d) Delirium with heart disease.
(e) Other conditions to be specified.

12. *Allied to infective-exhaustive psychoses.*

Cases which clinically resemble infective-exhaustive states but in which no infective-exhaustive etiology can be found.

13. *Autotoxic psychoses.*

(a) Thyreogenous disorders.
(b) Uremic disorders.
(c) Diabetic disorders.
(d) Other conditions to be specified.

14. *Manic-depressive psychoses.*

(a) Manic attack.
(b) Depressive attack.

(c) Stupor.
(d) Mixed attack.
(e) Circular attack.

15. *Allied to manic-depressive psychoses.*

16. *Involution melancholia.*

In spite of the fact that many of the depressions which have thus been designated are related to manic-depressive insanity, and that therefore a differential diagnosis may seem rather unnecessary, it is nevertheless advisable to group here all the depressions past middle life which show plain anxiety and agitation, and regard them as *special* form of the emotional reactions.

17. *Symptomatic depressions.*

Depressions closely associated with some physical ailment which more or less naturally predisposes to despondency (heart disease, gastric disorders, malignant growth, etc.). Fluctuations occur in the depression depending largely on the severity of the physical symptoms or degree of discomfort or pain which the patient suffers.

18. *Dementia praecox.*
(a) Paranoid form.
(b) Katatonic form.
(c) Hebephrenic form.
(d) Simple form.

19. *Allied to dementia praecox.*

20. *Paranoic conditions and paranoias.*

Delusional conditions in which the train of thought is clear and the contact with the environment is well preserved, though episodes of greater disturbance may occur.

21. *Epileptic psychoses.*

The epileptic disorders may be grouped according to the most prominent clinical manifestations, as follows:
(a) Deterioration.
(b) Clouded states.
(c) Other conditions.

22. *Psychoneuroses.*

These essentially substitutive reaction types may be outlined as follows:
(a) Hysterical type.

Submersion of a disturbing experience or conflict and conversion into hysterical manifestations, as a rule in the nature of somatic symptoms.

The psychoses most frequently characterized by psychogenic attacks, with more or less clouding of consciousness with subsequent amnesia.

(b) Psychasthenic type.

Conditions with phobias, obsessions, impulses, doubts, often associated with tension.

(c) Neurasthenic type.

Great mental and motor fatiguability accompanied by irritability, pains, hyperasthesias. The neurasthenic type can not always be satisfactorily differentiated from the psychasthenic.

23. *Constitutional inferiority with psychoses.*

By constitutional inferiority we mean abnormalities of mental make-up in which defects exist in the emotional and volitional sphere, but in which there is no obvious intellectual deficiency. Therefore we might in many cases of the well known constitutional psychoses speak of the individuals as constitutionally inferior (*e.g.* in dementia praecox or in manic-depressive insanity) but for obvious reasons it is better to limit the term "constitutional inferiority" to types of abnormal mental make-up which differ from these and in which the psychotic reactions also differ from the psychoses already specified in earlier groups.

24. *Mental deficiency with psychoses.*

This includes intellectual deficiency of various degrees. Traits of constitutional inferiority may be added.

25. *Unclassified.*

In this group should be included cases in which a diagnosis can not be made owing to lack of adequate data; or cases in which the clinical picture is not understood and the etiology is not known.

26. *Not insane.*

(a) Epilepsy.
(b) Alcoholism.
(c) Drug addiction.
(d) Constitutional inferiority.
(e) Mental deficiency.
(f) Dotage.
(g) Others to be specified.

THE INCREASING MORTALITY AFTER AGE FORTY-FIVE—SOME CAUSES AND EXPLANATIONS.*

By Louis I. Dublin, Ph.D., *Statistician, Metropolitan Life Insurance Company, New York.*

It is important that I state the problem of this paper clearly at the very outset. American statisticians have been concerned for some years with the fact that the death rates after age 45 are higher than they were, say, 10 or 15 years ago. Further back than 1900 it is impossible to go because of the lack of accurate data. The figures for the registration states in 1900 compared with those for the same states in 1914† show substantial decreases for every age period and for both sexes up to age 45. After age 45 there is a slight increase in the death rate for males. It is less than 4 per cent. in the age period 45–54; about 10 per cent. in the age period 55–64, and about 4 per cent. in the period 65–74. The age period 75 and over, shows little of importance. For females, the increase does not begin to appear until the age period 65–74. It is then about 1 per cent. higher in 1914 than in 1900. The reader will note that these increases are not very marked. They would call for very little attention were it not for the fact that this 15 year period has been one of extensive development in our public health service and of increasing prosperity in our country. It is perhaps disconcerting that there should have been an increase at all since the mortality rates of the more important European countries have shown no such increases at the corresponding ages.

The problem becomes much more interesting and acute as we leave the total mortality and concern ourselves with that from some of the causes of death which play an important part after age 45. This is, indeed, the phase of the subject that has received the greatest publicity and attention. We find, for example, in the registration area, in the registration states

* Read before the Annual Meeting of the American Statistical Association, Columbus, Ohio, December 28, 1916.

† The death rates for 1914 (registration states as constituted in 1900) were computed on the basis of the estimated population for 1914 distributed by age and sex in accordance with the 1910 census.

and in selected states having the longest period of good registration, that such causes of death as cancer, diabetes, cerebral hemorrhage and apoplexy, organic diseases of the heart, diseases of the arteries, cirrhosis of the liver, and Bright's disease, all show higher death rates in 1914 than in 1900. These causes of death are characteristic of the older age periods of life and in 1914 together accounted for 58.7 per cent. of the total mortality after 45 in the registration states as constituted in 1900. Cirrhosis of the liver shows the least increase in the total death rate, about 10 per cent. in these 15 years. Diseases of the arteries show the highest increase, nearly 454 per cent. Diabetes shows an increase of nearly 76 per cent. and organic diseases of the heart close to 45 per cent. in the same period. This then is our problem: to attempt to identify the factors involved in these higher death rates and to offer an explanation.

Some interesting explanations of the increasing mortality at the higher age groups have already appeared. The increasing industrialism of the country is supposed to subject the individual workman to greater wear and tear, which shows itself in higher death rates after age 45. The influence of the growth of our cities at the expense of the rural districts and the increasing number of persons engaged under the factory system—all of these points have been emphasized. Changing personal habits of life have also been charged with an important part in the phenomenon. It has been suggested that the supposed harder pace of business and social life today, the possibly diminished opportunities to get out in the open, to exercise, and to live moderately, have had an unfavorable effect upon those over 45. This has been the explanation offered by those identified with the Life Extension movement and by the advocates of periodic physical examinations generally. They have found in this thesis a powerful motive for their very useful propaganda. Their statements have in common the basic assumption that there has been a real and significant deterioration in our national vitality at the ages under consideration.

It is my purpose today to urge great caution in our acceptance of this conclusion. As statisticians we should first be sure that the simpler logical requirements of the problem have

been met before we attempt explanations at all; for with the field cleared up there may be no real phenomenon to explain. This is in effect what I propose to show.

In making comparisons we must make certain of the comparability of our data. In terms of the immediate problem, this means that we must be certain that the mortality rates of the earlier period, say 1900, are for a group of persons similar in essential respects to those of the later period. As a general thing, figures for the European countries meet this requirement. If the reports of the Registrar General of England and Wales show that the death rate per 1,000 in the age period 45–54 was 16.8 in 1880 and in 1910 only 12.7, we must conclude that there has been a decrease of 24 per cent. in the mortality at that age period and that the conditions of life have improved to that extent. But we cannot draw conclusions either one way or the other from similar American figures and for this reason: the character of our population of the earlier period has not remained unchanged. The years which we are considering were years of great change in the race constitution of American states and cities. They were years in which occurred a great influx of newer race stocks, an immigration which is making up a large and ever-increasing part of the population of our registration area. It is indispensable to the argument that the effect of this change in our race stock shall be determined as a part of the phenomenon we are considering. Does it make any difference that we have added to our population millions of Russians and Italians and Poles, whom we did not have at the earlier date? If not, then clearly the increasing mortality means something; it might even indicate physical deterioration after 45 as some writers would have us believe. If it can be shown, however, that these foreign races are contributing to the older ages of our population and that at these ages they have consistently higher mortality rates than our native stock, then the increase in the total mortality indicates nothing as an index of deterioration in the vitality of our native population.

The question resolves itself thus: Are *Americans* today experiencing a shorter expectation of life after 45 than did

Americans of a previous generation? I mean by Americans the native born of native parentage. Statistically, the problem has no meaning or value when stated in terms of the total population. The problem must be analyzed in terms of homogeneous groups of the population and comparisons must be limited within these groups.

For some time I have interested myself in just this phase of the problem. In a recent study of the death rates in the race stocks in New York State, 1910,* I showed how the important races compared with one another in respect to their mortality. Comparisons were made between (1) the native born of native parentage, (2) the native born of foreign or mixed parentage, and (3) the foreign born. Statistics are given in full in that report, but for this occasion, I shall summarize only those results which bear upon the problem of middle and old age mortality. We found consistently that after age 45 the group of native born of native parentage had the lowest mortality. This was true for both sexes. The superiority of the native stock over the foreign born is very marked indeed. The foreign born males had a death rate of 28.0 per thousand in the age period 45–64 as against a rate of 18.8 for the native born of native parentage, which is a difference of about 49 per cent. in favor of the latter group. The foreign born females in the age period 45–64 showed a rate of 23.4 as against a rate of 14.3 for the native born, a difference of nearly 64 per cent. in favor of the native born. The foreign born and the native born of foreign or mixed parentage, were remarkably alike as to the mortality of the males. This was not so for the females, however, the foreign born showing the highest rates.

On further analysis of the foreign born mortality we were able to distinguish the characteristics of the following nationalities: (1) Russians (for the most part Jews, in New York State), (2) Italians, (3) Germans, (4) Irish, (5) Austro-Hungarians, and (6) English, Scotch, and Welsh. Whatever be the foreign stock, virtually the same phenomenon of higher mortality appears in comparison with the native born of native parentage, the differences between the several nationality classes being one of degree only. Even the Russians

* "Factors in American Mortality—A Study of Death Rates in the Race Stocks of New York State, 1910." American Economic Review, Vol. VI., No. 3, September, 1916.

(Jews mostly) who are notable for their very low death rates during the early working years of life show consistently higher death rates after age 45 than do the native born of native parentage. When we turn to the Germans and the Irish the differences are remarkable. Thus, the Irish at the period 45–64 showed a rate of 46.3 per 1,000 for men as against 18.8 for the native born of native parentage, and for women, a rate of 40.7 as against 14.3 for the native born women of native parentage. The following table gives the figures for each of the foreign race stocks in comparison with the native born of native parentage for the age periods after 45 and for each of the sexes:

TABLE I.

DEATH RATES PER 1,000 IN PRINCIPAL NATIVITY CLASSES OF NEW YORK STATE POPULATION, 1910, CLASSIFIED BY AGE PERIOD AND BY SEX.

Age Period and Sex.	Native Born of Native Parentage.	Native Born of Foreign or Mixed Parentage.	Foreign Born.	Persons Born in					
				Russia.	Italy.	Germany.	Ireland.	England, Scotland, Wales.	Austria-Hungary.
45–64									
Males . . .	18.8	28.2	28.0	20.1	19.3	27.7	46.3	24.6	21.0
Females .	14.3	20.0	23.4	16.0	17.9	18.4	40.7	21.0	18.2
65–84									
Males . . .	77.3	89.9	90.4	78.4	64.6	90.4	101.6	86.6	77.5
Females .	68.2	73.9	87.7	66.8	63.8	83.1	107.4	79.9	63.9

This evidence cannot be discounted when we consider the problem of the increasing mortality after age 45. Its significance is evident when we note the changes that have occurred in the racial composition of the population of New York State during the 10 year period 1900 to 1910. In the former year, 39.2 per cent. of the entire population was native born of native parentage; in the latter year this proportion had fallen to 35.4 per cent. On the other hand, the foreign born white population increased from 26.0 per cent. to 29.9 per cent. The native born of foreign or mixed parentage changed slightly from 33.2 per cent. to 33.0 per cent. The following table shows side by side the proportionate distributions in 1900 and in 1910 of the three main groups of the population in New York State in the several age periods after 45:

TABLE II.

PERCENTAGE OF GENERAL NATIVITY GROUPS IN THE WHITE POPULATION OF NEW YORK STATE AT CERTAIN AGE PERIODS, 1900 AND 1910.

Age Period and Population Group.	1910.	1900.	Difference 1910–1900.
45–54 Years			
Total white population	100.0	100.0	....
Native born, native parentage	32.0	39.3	−7.3
Native born, foreign or mixed parentage	26.6	18.6	+8.0
Foreign born	41.4	42.1	−.7
55–64 Years			
Total white population	100.0	100.0	....
Native born, native parentage	39.8	44.4	−4.6
Native born, foreign or mixed parentage	18.0	10.3	+7.7
Foreign born	42.2	45.3	−3.1
65–74 Years			
Total white population	100.0	100.0	....
Native born, native parentage	45.9	49.3	−3.4
Native born, foreign or mixed parentage	10.5	5.8	+4.7
Foreign born	43.6	44.9	−1.3
75–84 Years			
Total white population	100.0	100.0	....
Native born, native parentage	51.2	56.6	−5.4
Native born, foreign or mixed parentage	6.3	4.8	+1.5
Foreign born	42.4	38.7	+3.7

The above table shows that the main effect of the change in the composition of our population has been to decrease the proportion of the native born of native parentage, that is, the group with the most favorable mortality after age 45. In 1900 this group comprised 39.3 per cent. of the New York State white population aged 45–54, but by 1910 this proportion had dropped to 32.0 per cent. Similarly in the age period 55–64, the proportion of the same group dropped from 44.4 per cent. to 39.8 per cent. The decrease in the proportion of the foreign born is more than balanced by the increase in the native born of foreign or mixed parentage who, as shown in Table I, are much more similar to the foreign born in their mortality characteristics than to the native born of native parentage.

An increase in the proportion of those having higher death rates and a corresponding decrease in the proportion of those having lower death rates must have the effect of increasing the total death rate. From this conclusion there can be no escape. The problem is, indeed, analagous to that of age standardization which is a necessary and accepted procedure in every day vital statistics work. No qualified statistician would com-

pare the crude death rates of two communities without taking into account the character of their age constitution at least. The Census Mortality Reports, for example, specifically give warning of the dangers of not making such corrections. It might very well be that one population had a larger proportion of infants and old people than the other with which it was being compared. I now insist that it is equally fallacious to compare the populations of two periods even for the same state when we know that there has been a change in the race composition and especially when we also know that this change affects the total death rate. In this particular instance, the change in the race composition in New York State has certainly increased the mortality after age 45.

So much for the death rates for all causes combined. The argument runs along very similar lines with reference to the supposed increase in the rates of the more important of the individual causes of death referred to above. The following table shows how much higher the death rates in New York State for two of these causes are for the foreign born than for the native born of the same ages. There are some exceptions, to be sure, but they are not many nor are they very important.

TABLE III.

DEATH RATES PER 100,000 FROM BRIGHT'S DISEASE AND ORGANIC DISEASES OF THE HEART FOR THE PRINCIPAL NATIVITY CLASSES OF NEW YORK STATE POPULATION, 1910.

Cause of Death, Sex and Age Period.	Persons Born in						
	United States.	Russia.	Italy.	Germany.	Ireland.	Austria-Hungary.	England, Scotland, Wales.
Bright's disease							
Males							
45–64	267.2	238.6	172.9	332.4	662.5	298.6	288.3
65–84	952.2	1322.4	807.9	1306.7	1299.1	1628.9	861.4
Females							
45–64	208.6	276.7	211.5	245.2	636.1	241.0	241.9
65–84	680.9	1273.6	549.8	1122.3	1388.6	852.6	826.0
Organic diseases of the heart							
Males							
45–64	316.3	254.2	250.8	328.9	580.2	244.3	272.1
65–84	1693.7	1254.0	1303.1	1905.5	2088.5	1062.3	1903.0
Females							
45–64	247.1	239.4	373.6	288.5	656.4	221.3	295.6
65–84	1369.3	1485.8	1649.3	1766.5	2312.1	1136.8	1791.4

It is unfortunate that I cannot give you for comparison the figures for the native born of native parentage for these causes. If we had reliable figures for this group the differences shown would stand out in even greater relief. This is clearly indicated in certain data now in our possession which are not yet ready for presentation. The rates for Bright's disease in the age period 45–64 are lowest for males born in the United States except for those born in Russia and in Italy. Males born in Ireland give a rate more than twice that for natives. Among females, ages 45–64, the rate for this disease is without exception lowest for the native born. In the age period 65–84 an occasional exception appears for both males and females; but, taken by and large, Bright's disease is more prevalent at these advanced ages among the foreign born stock than among natives. The figures for organic diseases of the heart, and, as reference to my previous study, "Factors in American Mortality," will show, the figures for other of the degenerative diseases point to a similar conclusion.

The apparent increase in the mortality from these causes in the population since 1900 must, therefore, be considered in the light of the changing character of our race constitution. The facts brought out in the discussion of the general deah rates above would seem to have an even greater application in relation to these special causes of death.

I desire finally to consider the degenerative disease problem from another angle. It may throw additional light on the supposed increase in their death rates. The diseases or rather the causes of death are those previously mentioned, but I shall repeat them for the sake of clearness: (1) Cancer, (2) diabetes, (3) cerebral hemorrhage and apoplexy, (4) organic diseases of the heart, (5) diseases of the arteries, (6) cirrhosis of the liver, and (7) Bright's disease. The supposition has been that the true incidence of these diseases has increased because their rates have gone up more or less steadily since 1900. I have shown above that the changing race factor played an important part in this rise, but in addition we must remember that the published rates are more or less subject to the influence of improving technical procedure in statistical offices. This is

not a minor matter. It is especially true of this group of diseases that the methods of classification in the Bureau of the Census and in other registration and compiling offices have been subject to progressive change. This has been the result of decisions of the International Commission and of the ever increasing effort to obtain more specific and complete statements of the primary cause of death. Moreover, many of the diseases under consideration are subject to errors of diagnosis. They often occur together and in combination with other conditions. The routine of stating them on death certificates as causes has not even now become crystallized in the minds of physicians. The last 15 years, moreover, has been a period of increasing interest in these diseases with the result that they are mentioned more often in cases where formerly no reference to them would have been made. All of these factors combined serve to make the group a very unsatisfactory one to discuss on the basis of the bare figures. There is a great deal to explain before comparisons can be made between 1900 and 1914. I propose in the following to take up a number of these diseases and to show how seriously the rates for them have been modified solely as the result of changes in medical and statistical nomenclature and practice.

I. CANCER.

The published rates for cancer have been markedly increased by more definite statements of cause on death certificates. Deaths previously reported as due to "tumor" and assigned to the non-malignant tumor class are now more generally described as cancers of some definite organ. This, moreover, is confirmed by the actual experience of those who have handled large numbers of death certificates and who in their correspondence with physicians have observed how readily a statement of "tumor" can be converted into a statement of cancer as a result of inquiry. We are also charging today many deaths to cancer which, in 1900, on the basis of the descriptions then given by physicians, would have been classified as septicemia, hemorrhage, pulmonary congestion, peritonitis, acute nephritis, and other conditions. This is also true of such titles as "disease" of the brain, "disease" of the

larynx, the mouth, the pharynx, the esophagus, the stomach and various other organs and members of the body usually subject to cancerous growths. Moreover, there is today much more certainty than before in the diagnosis of cancer as the result of the increase in the number of operations and laboratory examinations. The result of these changes in statistical and medical practice has been an increase in the reported death rate from cancer.

II. CEREBRAL HEMORRHAGE AND APOPLEXY.

Much of the apparent increase in cerebral hemorrhage and apoplexy is accounted for by the decrease in reports of "paralysis." In 1900, the rate for the latter disease was 25.9 per 100,000; in 1914 it had fallen to 9.7. Physicians now less frequently report "paralysis" but instead give the cerebral hemorrhage which caused the paralysis.* Furthermore, it is now the practice of vital statistical offices to return certificates where "paralysis" and "hemiplegia" are reported as causes of death and many such cases come back to the registration offices changed to "cerebral hemorrhage." Thus, in the returns of the Statistical Bureau of the Metropolitan Life Insurance Company, 61.1 per cent. of the queries on "paralysis" resulted in changes to "cerebral hemorrhage and apoplexy." These facts together with the known changes in race composition referred to earlier lead us to doubt seriously whether there has been any real increase in the incidence of this disease. All things considered, therefore, I doubt if there is any basis for the conclusion that there has been an actual increase in the mortality from this cause of death.

III. ORGANIC DISEASES OF THE HEART.

The marked changes that have occurred in the statistical treatment of this cause of death are best indicated by a comment appearing in the report of the Bureau of the Census on Mortality Statistics for the year 1910, page 54. In discussing the increase in the published rate from this disease the report says: "A part of this increase, however, was only apparent, being due to the fact that prior to the second revision of the

* In 1900, of the total number of deaths reported from both "paralysis" and cerebral hemorrhage and apoplexy, 27.6 per cent. were ascribed to the former; in 1914 only 11 per cent. were so returned.

International List, all deaths reported as due to 'endocarditis' (unqualified) and 'myocarditis' (unqualified) were compiled under 'acute endocarditis' (International Title No. 78), whereas in the compilation of 1910 the classification of the second revision has been used and such deaths of persons 60 years of age or over have been classified under 'organic diseases of the heart.'" This change in the classification of endocarditis and myocarditis has been in force since 1910.* Change in accepted procedure in editing jointly returned causes of death has also played a part in this seeming increase in the mortality from organic heart diseases. The Index of Joint Causes of Death published by the Bureau of the Census in 1913 shows that specifically reported causes like "mitral insufficiency," "valvular disease of the heart," etc., are now made preferred causes over certain diseases such as intestinal obstruction, paralysis agitans, tubo-ovarian abscess, Ludwig's angina, renal calculus, elephantiasis, and others. These, on the other hand, when reported in combination with less definite terms like "heart disease" are made preferred causes over the latter. Each year fewer physicians are returning "heart disease" and more of them are returning such definite reports as "mitral insufficiency." Finally, many deaths which formerly were returned as due to "dropsy" and to other conditions which were classified under the general heading "ill-defined organic disease," have lately been definitely ascribed to organic diseases of the heart. "Ill-defined organic diseases" have dropped from 7.2 per 100,000 in 1900 to 0.8 in 1914. These causes are especially prominent in the older ages. The consequence is that, more and more, deaths are being charged to organic heart diseases which formerly would have been tabulated elsewhere.

IV. DISEASES OF THE ARTERIES.

The immense increase in the published rate for diseases of the arteries is obviously not in accord with the facts. We are concerned simply with artifact—a change in the practice of physicians in reporting the causes of death in old age. It is

* In fact, in each report on mortality since and including that for 1910 the Bureau of the Census has placed on title No. 79 (Organic diseases of the heart) in its table giving rates for diseases for several years an asterisk to indicate that there have been changes "markedly affecting the comparability of the figures."

the experience of persons who have been engaged for years in handling death certificates that deaths which are now charged to arteriosclerosis would often have been reported in former years as due to "old age." In 1900, the death rate for "old age" was 50.4 per 100,000 and in 1914 it was only 19.8, that is, less than two fifths of the earlier rate. The interest of the medical profession has in recent years been directed toward arteriosclerosis and to allied diseases with the result that these diseases are more often reported where previously little attention would have been given to them. Hardened arteries may be assumed to be a normal condition in old age rather than a morbid one and it is partly because of the newer interest in the etiology of the condition that more deaths are being reported as due to them.

The progress that has been made in defining statements of cause of death is shown to some extent by the marked reduction in the death rates of all causes which are vague and indefinite in their nature. We have already referred to the decline in the rate for the ill-defined diseases. Deaths which were previously referred to this unsatisfactory group of causes are now very commonly classified at the older ages under more specific and definite titles, especially under one or another of the so-called "degenerative diseases."

SUMMARY AND CONCLUSION.

On the main subject at issue I am constrained to conclude that there is no evidence to support the contention that the true mortality rate of the country has increased after age 45. The problem will be decided definitely only when a new set of life tables, similar to those issued by the Census Bureau for the year 1910, appear at later decennial periods. No such data are now at hand. Enough facts are in evidence, however, to warrant the conclusion that the changing constitution of our race stock is responsible for the slight increase in mortality that has occurred. It is perfectly true that the marked decreases in mortality which are characteristic of the earlier ages of life do not continue after age 45. Nor could they be expected to under any circumstances. Immortality is not one of our characteristics. Persons who do not die from the in-

fections and accidents at the earlier ages will necessarily come to death at the more advanced ages. This is no cause for apprehension from the health or any other community standpoint. We are not concerned with a social misfortune when the mortality after age 75 increases and apparently the figures indicate that for the present at least no increases have occurred up to that advanced age.

As to the alleged increase in the death rate from the so-called degenerative diseases, the causes of death most prominent in middle and old age, these are due to two factors; first, to the changes in our race composition, and second, and perhaps equally important, to the changes in International and local statistical practice with reference to their assignment on death certificates. Together, these facts throw grave doubt on the assumption that any of these diseases has increased at the ages in which we are economically and socially interested. It is high time, therefore, that the ghost of these degenerative diseases was laid and the program for life conservation at middle life and at the older ages was established upon sound scientific premises. It is not necessary to urge a worthy cause on false assumptions. It is very desirable to call attention to bad habits of life, to overeating and drinking, to lack of exercise, all of which result in degenerative processes; and it is certainly to be desired that persons shall have themselves physically examined each year in order to discover impairments and defects when they are only slightly developed rather than to allow them to proceed until a breakdown occurs. This movement deserves the support of all and indeed has given good evidence of excellent returns for the future. In this paper, however, I must insist that the program of life conservation shall not continue to be tied up to or made dependent upon misleading statistics. There is no evidence at hand at the present time to justify the statement that conditions of life in America are increasing the mortality rates at the productive ages.

ON THE CORRELATION BETWEEN THE VOTE FOR SUFFRAGE AND THE VOTE ON THE LIQUOR QUESTION. A PRELIMINARY STUDY.

By C. E. Gehlke, Ph.D., *Assistant Professor of Sociology, Western Reserve University.**

In current discussions of the factors tending to the extension of the suffrage to women, and of the effects of that extension, two statements are frequently found. The first is that in the United States, woman suffrage is opposed by those groups in the electorate who are favorable to the continuance of the legalized manufacture and sale of alcoholic liquors. Another is that woman suffrage will be the doom of the legalized sale of liquor, and that fear of this outcome causes the "liquor interests" to oppose suffrage.

This paper presents a preliminary statistical investigation of the probability of the truth of the first statement.

In 1912, the state of Ohio voted on a number of amendments to the State Constitution.† One of these amendments proposed to give the suffrage to women. Another instituted a system of licensing the sale of liquor. Previous to the passage of this latter amendment, the sale of liquor was not licensed but took place under a liquor taxing law.

In 1914, a suffrage amendment was again voted on. At the same election, the question of state-wide prohibition was also presented for referendum action as a proposed amendment to the Constitution.‡

The question of license was not a clear-cut, pro- and anti-liquor issue. It was a matter of common knowledge at that time that many voters preferred prohibition to any system of regulation. Not being able to vote for prohibition, many of them did what seemed to them the next best thing, voted for license. The liquor interests supported the license amend-

* The author wishes to express his obligation to two of his former students, Mr. Fred McNaughton and Mr. C. R. Strobel, for the collection of material for this paper.

† See appendix.

‡ See appendix.

ment, for while it put them under regulation, it at the same time legalized the traffic. If license had been a straight out and out pro-liquor proposition the major supposition which we are testing would have given this result: in a given voting district a relatively high vote for suffrage would have been found concomitant with a relatively low vote for license. Expressed in statistical terms, there would have been a high inverse correlation between license and suffrage. If part of the opponents of the liquor traffic had voted for license as giving control, if not elimination, of the sale of alcohol, the degree of inverse correlation would have been lessened compared with what it would have been if a vote had been taken on a clear-cut pro-liquor proposal. To put it quantitatively, if the correlation between the vote for suffrage and the vote for some completely pro-liquor amendment had been, *e. g.*, $-.8$, then the correlation of the pro-suffrage vote and the pro-license vote would have been something less than $-.8$, say $-.5$ or $-.4$.

This general argument applied to the second pair of votes, that of 1914 on suffrage and on prohibition, ought to give a positive correlation for these two; very high, if the sentiment of the anti-suffrage group was strongly in favor of the liquor interests.

The method of testing these probabilities was as follows:

The records of the respective elections in the voting precincts of Cuyahoga County (containing the City of Cleveland, two large suburbs, several smaller ones and a rural and village population) to the number of over five hundred furnished the material. This was arranged on cards, one for each precinct. A sample card is shown.

18—C	For.	Against.	Total Vote.	Per Cent. of Vote in Favor.
(Suffrage)	78	42	120	65.0
(License)	27	94	121	22.3
(Suffrage)	77	33	110	70.0
(Prohibition)	92	41	133	69.1

These five hundred cards were then thoroughly shuffled and there were selected at random two sets of one hundred cards

each. Each set would prove a check on the other, serving as a test of the fairness of the choice.

The cards of one set were then sorted for the first correlation (taking suffrage as the subject and license as the relative), into classes as follows: 0.0 to 4.9 per cent., 5.0 to 9.9 per cent., etc. The same class interval was employed for subject and relative. This was repeated with the second set of cards.*

After the correlation tables for suffrage and license were completed, the cards were sorted for the vote on suffrage and prohibition. The suffrage was again the subject and prohibition the relative.†

The similarity between the two tables of each of the elections is marked.

The correlation coefficients were the following:

Table (A)	$r=-.571$	$\pm.046$	Suffrage and license, 1912.
(B)	$r=-.593$	$\pm.044$	
(AA)	$r=+.838$	$\pm.020$	Suffrage and prohibition, 1914.
(BB)	$r=+.894$	$\pm.014$	

These results seem to bear out the supposition which was to be tested. An analysis of the material will make the validity of the method more evident.‡

The total number of votes for and against suffrage in each precinct, was in the large majority of cases numerically greater than the number cast on the question of license.

	Greater.	Equal.	Less.
Table (A)	98	1	1
(B)	97	1	2

The total number of votes on suffrage compared with the total number of prohibition votes showed these results:

	Less.	Equal.	Greater.
Table (AA)	97	0	3
(BB)	99	1	0

* See Tables A and B.

† See Tables AA and BB.

‡ The linearity of table A was tested by the simple criterion cited by William Brown (Mental Measurement, p. 59) from J. Blakeman (*Biometrika*, Vol. IV, p. 349–350)

$$\frac{\sqrt{N}}{.67449} \cdot \tfrac{1}{3}\sqrt{\eta^2-r^2} < 2.5$$

Where η = standard deviation of the means of the arrays divided by the standard deviation of the entire distribution (respectively) of X or Y.

If the number of votes in each precinct on suffrage had been equal to the number of votes on license, the correlation between the absolute affirmative votes could have been calculated directly. As they were in nearly every case unequal, the percentage that the affirmative vote on a question was of the total vote cast on that question seemed the fairest measure of the opinion and will of the voters of the precinct.

These facts and this method bring up two possible criticisms which require a brief discussion.

1. It may be objected that these correlation coefficients do not measure the correlation of the two sets of opinions in the mind of an average individual voter. Take a precinct chosen at random:

	For.	Against.	Total.	Per Cent. For.
Suffrage.....	29	103	132	22.0
License.....	108	13	121	89.2

The total number of voters in this precinct was at least 132. At least 11 of them did not vote on the license issue. If there were more than 132 voters, some of the 121 who voted on license, may not have voted on suffrage. If the number of voters had been 132 plus 121, it would have been possible to have had two entirely different groups voting on these two issues.

It is evident then, that the figures we have here are not an accurate statement of the coexistence in the mind of any voter of opinions and desires on these two questions. For if there were 132 plus 121 (*i. e.*, 353) voters in the precinct and 132 voted on suffrage and another 121 voted on license, our data would be absolutely useless for the determination of whether an average individual Z voted for or against suffrage and for or against license. The only way to get at this question would be to note each ballot as it was counted and to make for each voter a table:

Suffrage	No	Yes
License	No	Yes

Summing these tables, we should get for a precinct, for those who voted on both issues:

		Suffrage: NO	Suffrage: YES	
License	No	a	b	a+b
	Yes	c	d	c+d
		a+c	b+d	

Where a = the number voting "no" on both issues.

Where b = the number voting "yes" on suffrage and "no" on license, etc.

Such data could be handled by means of Pearson's method for correlation of non-quantitative qualities* or by the association coefficient suggested by Yule.† That would give us an accurate measure of the association of these four desires in the minds of the individual voters.

We have no such data, however. Therefore we must interpret what we have in a somewhat different manner. Let us call the percentage vote in a given precinct for the respective issue a measure of the opinion of the voting body on that issue. If all the voters do not participate it presumes ignorance or a state of indifference regarding this issue on the part of those not voting on it. Our correlation coefficients then express the concomitance of the pairs of opinions of the electorate divided into the more or less fictitious units of voting precincts. In a way, the votes might be said to express neighborhood opinion, since the boundaries of American neighborhoods are so indefinite that the precinct is probably as good a unit as any for our purpose. In short, we may say that our data show that on the average, a neighborhood in Cuyahoga County which was strongly for suffrage was strongly for prohibition and less strongly against license.

* Pearson, K.: Mathematical Contributions to the Theory of Evolution; On the Correlation of Characters not Quantitatively Measurable. Phil. Trans., A, CXCV, pp. 1–47, August 16, 1900.

† Yule, G. U.: An Introduction to the Theory of Statistics, p. 38.

2. The use of percentages instead of absolute values raises the question as to the possibility of our correlations being unduly high because of the existence of a "spurious correlation." If the votes were expressed as percentages of the same quantity for each precinct, this objection would hold: "When two characters, a and b are measured in each individual of a series of individuals, and each absolute magnitude is transformed into an index by dividing it by the magnitude of a third character c as found in the same individual, a spurious correlation will be found to exist between the indices of $\frac{a}{c}$ and $\frac{b}{c}$."*

Tested by this statement of Davenport's, there is no spurious correlation here. For, as was pointed out above, the number of votes on suffrage is different from the number cast at the same time for license; similarly for suffrage and prohibition. So that instead of a situation expressed by the symbols $\frac{a}{c}$ and $\frac{b}{c}$ we have, rather $\frac{a(\text{the pro-suffrage vote})}{m(\text{total vote on suffrage})}$, $\frac{b(\text{the pro-license vote})}{n(\text{the total vote on license})}$.

TABLE (A).

PERCENTAGE OF VOTE ON SUFFRAGE CAST IN FAVOR OF SUFFRAGE.

Percentage of vote on license cast in favor of license.	5 | 9.9	10 | 14.9	15 | 19.9	20 | 24.9	25 | 29.9	30 | 34.9	35 | 39.9	40 | 44.9	45 | 49.9	50 | 54.9	55 | 59.9	60 | 64.9	
45–49.9											1		1
50–54.9									1			1	2
55–59.9										1	1		2
60–64.9						2	1	1		1	1		6
65–69.9				2			1		1	2	1	2	9
70–74.9					2	4	1	4	4	7	1	1	24
75–79.9			1	4	2	1	4	1	4	3	1		21
80–84.9			4	2	4	4	1	8			1		24
85–89.9	1	1	4		1	2	1						10
90–94.9			1										1
	1	1	10	8	9	13	9	14	10	14	7	4	100

* Davenport, C. B.: Statistical Methods, p. 54. See also Yule (*op. cit.*), pp. 211–212, and William Brown (*op. cit.*), p. 77.

TABLE (B).

PERCENTAGE OF VOTE ON SUFFRAGE CAST IN FAVOR OF SUFFRAGE.

Percentage of vote on license cast in favor of license.	0 | 4.9	5 | 9.9	10 | 14.9	15 | 19.9	20 | 24.9	25 | 29.9	30 | 34.9	35 | 39.9	40 | 44.9	45 | 49.9	50 | 54.9	55 | 59.9	60 | 64.9	65 | 69.9	70 | 74.9		
55–59.9			1									1					2
60–64.9											1	2					3
65–69.9									3	1	3		1	2			10
70–74.9			1			2			2	3	1	1		1	1		13
75–79.9						3	1	6	4	5	1	1					21
80–84.9		1		2	1	4	3	3	3	2	2						21
85–89.9		2	4	5	3	3		2	1	2							22
90–94.9			2		2	1	1			1							7
95–99.9	1																1
	1	3	8	7	6	14	5	11	13	14	8	5	1	3	1		100

TABLE (AA).

PERCENTAGE OF VOTE ON SUFFRAGE CAST IN FAVOR OF SUFFRAGE.

Percentage of vote cast on prohibition in favor of prohibition.	5 | 9.9	10 | 14.9	15 | 19.9	20 | 24.9	25 | 29.9	30 | 34.9	35 | 39.9	40 | 44.9	45 | 49.9	50 | 54.9	55 | 59.9	60 | 64.9	65 | 69.9	70 | 74.9	
0–4.9		1													1
5–9.9	2	4				1									7
10–14.9		4	2	1											7
15–19.9			5	6	1										12
20–24.9			1	2	3	1									7
25–29.9			1	1		2	4	1							9
30–34.9				1	2	3	1	1							8
35–39.9				1		4	2	1	1						9
40–44.9							4	6	2	1				1	14
45–49.0			1					1	1	1	2				6
50–54.9									1	8	2				11
55–59.9					1		1			1	1				4
60–64.9												1	1		2
65–69.9												1			1
70–74.9															0
75–79.9										2					2
	2	9	10	12	7	11	12	10	7	11	5	2	1	1	100

TABLE (BB).

PERCENTAGE OF VOTE ON SUFFRAGE CAST IN FAVOR OF SUFFRAGE.

Percentage of vote on prohibition cast in favor of prohibition.	5 | 9.9	10 | 14.9	15 | 19.9	20 | 24.9	25 | 29.9	30 | 34.9	35 | 39.9	40 | 44.9	45 | 49.9	50 | 54.9	55 | 59.9	60 | 64.9		
0- 4.9	1													1
5- 9.9	6	4												10
10-14.9	2	2	3	1	2									10
15-19.9		2	3	3	1									9
20-24.9			3	6	3									12
25-29.9				1	4	1		1						7
30-34.9		1			2	1	4	2						10
35-39.9						2		4	1					7
40-44.9							1	5	1	2				9
45-49.9								1	2	6	1			10
50-54.9								1	2	4	4	1		12
55-59.9									1		1	1		3
	9	9	9	11	12	4	5	14	7	12	6	2		100

APPENDIX.

Proposed Amendments to the Constitution of Ohio Voted on at Election of September 3, 1912.

SECTION 1. Every citizen of the United States, of the age of twenty-one years, who shall have been a resident of the state one year next preceding the election, and of the county, township or ward in which he or she resides such time as may be provided by law, shall have the qualifications of an elector and be entitled to vote at all elections.

SECT. 9. License to traffic in intoxicating liquors shall be granted in this state, and license laws operative throughout the state shall be passed with such restrictions and regulations as may be provided by law, and municipal corporations shall be authorized by general laws to provide for the limitation of the number of saloons. Laws shall not be passed authorizing more than one saloon in each township or municipality of less than five hundred population, or more than one saloon for each five hundred population, in other townships and municipalities. Where the traffic is or may be prohibited under laws applying to counties, municipalities, townships, residence districts, or other districts now prescribed by law, the traffic shall not be licensed in any such local sub-division while any prohibitory law is operative therein, and nothing herein contained shall be so construed as to repeal, modify or suspend any such prohibitory laws, or any regulatory laws now in force

or hereafter enacted, or to prevent the future enactment, modification or repeal of any prohibitory or regulatory laws. License to traffic in intoxicating liquors shall not be granted to any person who at the time of making application therefor is not a citizen of the United States and of good moral character. License shall not be granted to any applicant who is in any way interested in the business conducted at any other place where intoxicating liquors are sold or kept for sale as a beverage nor shall such license be granted unless the applicant or applicants are the only persons in any way pecuniarily interested in the business for which the license is sought and no other person shall be in any way interested therein during the continuance of the license; if such interest of such person shall appear, the license shall be deemed revoked. If any licensee is more than once convicted for a violation of the laws in force to regulate the traffic in intoxicating liquors, his license shall be deemed revoked, and no license shall thereafter be granted to him. License to traffic in intoxicating liquors shall not be granted unless the place of traffic under such license shall be located in the county in which the person or persons reside whose duty it is to grant such license, or in a county adjoining thereto. The word "saloon" as used in this section is defined to be a place where intoxicating liquors are sold, or kept for sale, as a beverage in quantities less than one gallon.

Proposed Amendments to the Constitution of Ohio Voted on at Election of November 3, 1914.

Article V, Section 1.

SECTION 1. Every citizen of the United States, of the age of twenty-one years, who shall have been a resident of the state one year next preceding the election, and of the county, township, or ward, in which he or she resides, such time as may be provided by law, shall have the qualifications of an elector, and be entitled to vote at all elections.

Article XV, Section 9.

SECTION 9. The sale, manufacture for sale and importation for sale of intoxicating liquor as a beverage is hereby prohibited. The General Assembly shall provide for the enforcement of this provision and enact laws with adequate penalties for the violation thereof.

THE PRESENT STATUS OF BIRTH REGISTRATION IN AMERICAN CITIES AND ITS RELATION TO THE INFANT MORTALITY RATE.*

By Louis I. Dublin, Ph.D., *Statistician, Metropolitan Life Insurance Company, New York.*

It requires no extensive statistical research at this time to prove that infant mortality in the United States in recent years has been much reduced and that it can be still further reduced. Communities, however, are not content with this general proposition but desire to know the part they individually play in this reduction. They have their own health problems and they are interested primarily in the facts for their own localities. Cities very properly wish to know what their present infant mortality is, what the trend of that mortality has been during the last five or ten years and what they may hope to accomplish in the next few years in still further reducing their losses. These questions, as we shall see, cannot be readily answered. In this paper I propose to consider the chief limitations on our effort to determine accurately the facts of infant mortality in American cities. I shall show that many of our cities are, indeed, in no position to know the trend of their infant mortality. It must be clear to us that as scientific men we must first insist that our programs to control disease be based on reliable foundations and not on vague impressions or on statistical data subject to very serious error.

The infant mortality rate is the ratio between two figures. The first is the number of births registered in a given period (usually a calendar year); the second is the number of deaths of children under one year of age during the same period, stillbirths being excluded from both figures. There are other measures of infant mortality which are somewhat different; but the infant mortality rate as described is the one in commonest use in present day practice. It is obvious that this infant mortality rate is correct or incorrect in proportion to the

* Paper presented at the Seventh Annual Meeting of the American Association for Study and Prevention of Infant Mortality, Milwaukee, Wisconsin, October, 1916.

accuracy of the figures which compose it. If either one or both are wrong the rate will likewise be wrong. Let us consider a few of the possibilities. If the deaths of infants under one are not all recorded, the rate will clearly be too low. Again, if the number of births is, for any reason, not completely registered the infant mortality rate will appear higher than it really is. Finally, if both deaths and births are underregistered, the rate will be wrong except in the rare instances when numerator and denominator are incorrect in the same ratio.

It must be clear, therefore, that the accuracy of the infant mortality rate and of its derivative, the trend of the infant mortality rate, depends on the completeness of registration of births and deaths. Of these two, the registration of deaths has been insisted upon longer by the communities of our country. Considerable state and municipal machinery has been put into operation for this purpose. Laws are in effective operation over a large area of the country, the so-called Registration Area for Deaths, and the interest of the communities and of physicians has been developed to make such registration of deaths more and more complete. We can assume safely that, in the great majority of the cities and states included in the Registration Area, which today comprises over two thirds of the total population of the country, death registration is practically complete. The margin of error is certainly not greater than 10 per cent. and in many cases much less.

Much more serious for our purposes is the matter of birth registration. There is as yet only the beginning of a Registration Area for Births. Adequate legal provision for birth registration exists in a number of states but in many where there is a law it is certain that the law is not enforced. Such is the general consensus of opinion of those most interested in this phase of our vital statistics.

Accordingly, during the course of the last year, we undertook a systematic inquiry into the present status of birth registration throughout the United States. To this end we wrote to the registrars and other officials of all the states and cities which have been included in the Registration Area for deaths since 1910. We asked for the number of births registered in their respective communities during each of the years since

1910. In all, about 500 inquiries were sent; replies were received from 16 states and 168 cities. We at once found it necessary to disregard the replies from the state officials; birth reporting is still a local function and it is only with reference to the cities that any inquiry can possibly be worth while. In all, we found only 144 cities whose replies were sufficiently complete to justify analysis. Fortunately, this group of cities is representative of the entire country, since it includes the larger as well as the smaller ones. In the first part of this paper I shall put at your disposal an analysis of the replies from these cities and, upon the basis of the data which they supply, attempt to estimate by a number of simple tests the accuracy and completeness of birth registration in the United States in 1915 and the preceding five years.

The first test of the accuracy and completeness of birth registration is that the number of births registered in any community in a calendar year shall be greater than the number of living children under one year old. For this test the two sets of figures for the year 1910 were available, namely, the census returns for children under one and the replies to our questionnaire giving the number of births registered during the year. We found that the births actually had exceeded the number of children under one in a large number of the cities, although the excess varied considerably from city to city. In 23 out of the 144, or in 15.9 per cent. of all the cities, however, the reverse was true—the population under one did exceed the number of births reported for the year. In all these cities the registration of births was clearly inaccurate and very probably to a high degree; in some, the births registered were certainly less than one half the true number. Table I below gives a list of the 23 cities arranged in the order of the supposed inaccuracy of their birth registration as indicated by this test. The group includes some small towns, but also a number of large cities. Thus we find Baltimore, Chicago, Jersey City, Nashville and Birmingham, Ala., with populations of over 100,000: a few others had populations between 50,000 and 100,000.

TABLE I.

CITIES WHERE POPULATION UNDER 1 YEAR OF AGE EXCEEDED BIRTHS REGISTERED IN 1910.

City.	Population under 1 1910.	Excess over Births.	Per Cent. Excess.
Riverside, Cal.	269	9	3.3
Baltimore, Md.	10,239	381	3.7
Winthrop, Mass.	190	9	4.7
Birmingham, Ala.	2,939	162	5.5
Camden, N. J.	2,081	123	5.9
Kearny, N. J.	395	30	7.6
Sunbury, Pa.	361	33	9.1
Norwood, Ohio	297	29	9.8
Fort Wayne, Ind.	1,104	126	11.4
Youngstown, Ohio	1,954	260	13.3
Santa Cruz, Cal.	160	26	16.3
Superior, Wis.	872	153	17.5
Wheeling, W. Va.	781	147	18.8
Elisabeth, N. J.	1,902	362	19.0
Alpena, Mich.	301	64	21.3
Nashville, Tenn.	2,139	470	22.0
Hammond, Ind.	548	133	24.3
Jersey City, N. J.	6,229	1,662	26.7
East Chicago, Ind.	654	232	35.5
Stockton, Cal.	324	135	41.7
Chicago, Ill.	49,073	24,705	50.3
Madison, Wis.	474	257	54.2
Ogden, Utah	647	389	60.1

The second test of the accuracy and completeness of birth registration is the extent to which the birth rate varies from year to year. We should view with suspicion violent changes in the birth rate from year to year or within a few years unless a plausible explanation is at hand. Applying this test we find a number of cities where there has been a decrease between 1910 and 1915. For the most part these decreases are moderate and may very well reflect the true condition of the birth rate in the cities. In some, however, the reduction is very marked indeed. Lynn, Mass., for example, showed a birth rate in 1910 of 26.8 per 1,000; in 1914 the figure had been reduced to 22.3 and in 1915 to 22.1. Such a condition very properly raises a question as to the accuracy of the birth registration in this city in the years 1914 and 1915. In Dover, N. H., the birth rate in 1910 was 23.9; in 1914 it fell to 18.2, and in 1915 rose again to 23.7. These returns also are subject to question. More serious, however, is the fact that in a large number of cities the birth rate increased in a very suspicious manner. In some cities the birth rate in 1915 was close to or even more than twice that in 1910. A list of 8 such cities is given in the following table:

TABLE II.

CITIES WITH EXCESSIVE INCREASE IN BIRTH RATES DURING THE PERIOD 1910 TO 1915.

City.	Birth Rate per 1,000 Population.			Per Cent. of Increase, 1910 to 1915.
	1910.	1914.	1915.	
Hammond, Ind.	19.7	33.7	32.4	64
San Diego, Cal.	11.8	22.8	20.4	73
Trenton, N. J.	15.8	31.1	28.0	77
Chicago, Ill.	11.1	21.7	21.1	90
East Chicago, Ind.	21.7	47.1	42.1	94
Stockton, Cal.	8.1	17.0	16.1	99
Ogden, Utah.	10.0	29.8	25.6	156
Madison, Wis.	8.5	25.7	22.4	164

The maximum increase in the birth rate is noted in Madison, Wis., where in 1915 the birth rate was 164 per cent. higher than in 1910. Increases in birth rates as shown in the preceding table are absolutely inexplicable on the basis of a normal increase in fertility and can be explained only on the ground of improved registration. Our conclusion is, therefore, that in the cities listed above the number of births reported in 1910 was entirely untrustworthy and that birth registration had improved perceptibly in 1915. But it must not be concluded from this that the birth registration in 1915 had attained its true value in all of them.

In this connection, an examination of the data for the 144 cities as a whole will be of interest. Because of the belated arrival of some of the 1915 figures we were compelled to compare 1910 with 1914. We found that the number of births in these cities combined increased 20.7 per cent. during the interval between 1910 and 1914. The increase of the population of these cities during the same period was only 10.2 per cent. This last figure must be considered in the light of the fact that during the period the chief source of increase in the population of American cities was through immigration. As might be expected the birth rate for 1914 exceeded that for 1910, the figures being 24.7 and 22.6, respectively. Included in the 144 cities, however, are two of the largest cities in the country, namely, New York and Philadelphia, which together account for 31 per cent. of the total population of the 144 cities. A very different

condition is found in them. In New York City the birth rate in 1910 was 26.9 per 1,000 and in 1914, 26.4. In Philadelphia the two figures were 24.9 and 24.8. The two cities combined gave a birth rate of 26.4 in 1910 and 26.0 in 1914. If we eliminate them from consideration in our total we find for the residue that the birth rate has very markedly increased since 1910; it was then 20.9 and in 1914, 24.2. We are accordingly confronted with the interesting fact that in two of the largest cities of the country, where birth registration has been fairly reliable since 1910, the birth rate has decreased; in the 142 other cities, taken as a group, the birth rate has very decidedly increased. In view of the evidence already at hand we are much more likely to be concerned in these figures with an improvement of birth registration in the cities as a unit than with an increase in the birth rate.

To further satisfy ourselves as to this we correlated the increase in the birth rate in the cities between 1910 and 1914 with the condition of the birth rate in 1910. In other words, we attempted to find out by means of a more refined analysis whether a low birth rate in 1910 was in general followed by an increase in the birth rate in the four subsequent years or *vice versa*. Our findings are very clear on this point. We obtained a negative correlation of over .45. This is significant, for it shows that on the whole wherever the birth rate in 1910 was below the average, there appeared during the next four years an increase in the number of births proportionately greater than that in the population and, furthermore, that the greater the deficiency in the birth rate in 1910, the greater the proportionate increase in the birth rate after that year.

There are few who, in view of the results of the tests we have applied, will doubt the incompleteness of birth registration in 1910 or in the next succeeding year or two. We must now consider the more important question whether the birth registration of 1915 may be considered reliable. To this end we arranged our cities in the order of their increasing birth rates for the year 1915. The lowest birth rate in our list of cities was in Santa Cruz, Cal., where the rate was 10.9 per 1,000; the highest birth rate was in Chicopee, Mass., where it was 42.7. The average birth rate was 24.5. If the reader will turn to the

table in the appendix in which the birth rates of the 144 cities in 1914 and 1915 are given, he will see that the rates for many of the cities vary markedly from this average. Such variability in birth rates can hardly, I believe, be explained on the basis of climatic, industrial, or racial difference alone. The only conclusion is that many of the cities with extremely low birth rates are still far from having solved their problem of birth registration.

We can at this point apply a third test of the accuracy and completeness of birth registration, the extent to which the birth rate of a city falls below what may be considered as the minimum normal birth rate for American cities. It is difficult, at this time, to lay down a general law as to what the birth rate of American communities should be since that depends upon the constitution of the population and other economic factors. The proportion of foreign to native born is perhaps the most important factor; the age constitution and the proportion of males to females are also to be considered. However, it appears to me to be entirely justifiable to doubt the accuracy of a birth rate in any but a few of our cities which is less than 20 per 1,000 of the population. In some communities where the foreign born stock predominates a birth rate under 25 should be accepted with question. In a number of communities even a birth rate of 25 per 1,000 may be considerably below the truth. For purposes of administrative control, however, a birth rate of 20 should be considered by the health officer as a minimum and his every effort thereafter should be to raise this minimum as his machinery for checking poor registration is improved. In 1915, 32 of the cities included in the study fell below this very conservative minimum. The other tests we have applied, however, indicate that the proportion of the 144 cities with defective birth registration in 1915 is much higher than this.

The defects in present day birth registration must result in very serious embarrassment to the practical worker in the field of infant hygiene, for, as was pointed out at the beginning, incomplete birth registration exaggerates the infant mortality rate and destroys comparability between the figures for different communities. I can illustrate this point with facts for the

city of Baltimore in 1910 and thereafter. In 1910, the infant mortality rate for this city was 217.7. In 1915 the rate was 119.8, a reduction of nearly one half. This is a most remarkable showing for so short a period and, if true, it should be a source of great encouragement to the health officers and private agencies of Baltimore concerned with the control of infant mortality in that city. There are, however, a few disturbing facts which must be taken into consideration. Thus in 1910 the recorded birth rate was only 17.6 per 1,000 population; in 1915 it had increased to 23.3. This suggests that we are concerned not alone with a reduction in infant mortality, but also with the effects of improved birth registration. We find, for example, that while the population increased 4.3 per cent. between 1910 and 1915, the number of births actually increased 38.3 per cent. If we apply the birth rate of 1915 to the population of 1910 we would obtain 13,037 births as against 9,858 births which were actually registered. The infant mortality rate for 1910 on this basis would have been 164.6 as against 217.7 which is the rate quoted above. It must be evident, therefore, that the marked decrease in the infant mortality rate is not all clear gain and that a large amount of it is fictitious, being the result of improved municipal bookkeeping.

We could, in like manner, take the returns of a large number of other cities which are undoubtedly proud of their successful campaigns against infant mortality and show, like Baltimore, that much of their supposed life saving is simply a reward for their recent growing interest in birth registration. It would be highly desirable in this connection if the annual circular of the New York Milk Committee on infant mortality rates in the cities of the United States, in singling out cities for praise or blame dependent upon their low or high rates took into consideration the effect of poor birth registration on infant mortality rates. A number of the cities listed in the Milk Committee's annual report for 1915 show exaggerated rates, since the births reported are clearly underestimates. This is especially true for a number of the smaller cities.

In view of the present condition of birth registration and the resulting unreliability of infant mortality rates, what can the statistician offer as a substitute to serve until birth registra-

tion in our cities is more complete? Frankly there is no satisfactory substitute for the infant mortality rate. A number of measures have from time to time been used. Thus, the "infant death rate," which is the ratio of the number of deaths of infants to the number of living children under one, has been employed by the Census Bureau. This is, however, subject to very serious error because the number of living children under one is known approximately only for census years and is even then subject to very serious error of misstatement.

Another index is the ratio of the number of deaths of children under one to the total population of all ages as estimated for the year. This measure has the advantage that both numerator and denominator which enter into it can be made fairly accurate. It is especially useful in determining the trend of infant mortality over a short period of years in any one city. However, difficulties at once arise, when it is attempted to compare the rates of different communities with one another. Differences which may appear in such comparisons may not at all be the result of higher or lower actual mortality rates, but rather of the different birth rates in the two places. Thus, if two cities of the same size, say 100,000, have birth rates of 25 and 30, respectively, the city with the higher birth rate will have the larger number of infants born annually, 3,000, as against 2,500 in the second city. A similar infant mortality rate, say of 10 per cent., will result in 300 infant deaths in the one city as against 250 deaths in the other. The actual infant mortality rates would be the same, but the substitute measure will indicate a higher death rate in the city with the higher birth rate, 3.0 as against 2.5 per 1,000 population. Nevertheless for communities where birth registration is known to be very incomplete, the error that results from the use of this substitute index will be less than that resulting from the use of the incorrect number of births. The general principle is that when dealing with factors of error it is safer to work with large numbers than with small ones, for example, with total population than with births.

Another measure which is sometimes used in communities with poor birth registration is the percentage of infant deaths to total deaths. This ratio, like the previous one, has the ad-

vantage that the figures entering into it may be presumed to be fairly accurate. The measure, however, has the serious disadvantage of all such proportions in that it does not take into consideration the number of infants exposed. We may very well have, for example, an unusually high proportionate mortality with a low infant mortality rate; this would be the case if the general mortality rate was low Again, a low percentage of infant mortality may occur where the actual infant mortality and the general mortality rates are both high. It is not at all difficult to present a list of cities with high infant mortality rates and low proportions, and conversely.

There is, therefore, no satisfactory substitute for the infant mortality rate. In order to have a measure of the mortality of infants, we must know of necessity the number of infants exposed to death and this means that we must have complete birth registration.

My purpose here is not so much to criticize our present shortcomings as to point out a remedy for a serious evil. Those of us who are interested in the reduction of infant mortality have no choice but to set about to build up machinery for registering officially and quickly every child born. To this end, the way is fairly clear. An adequate law for the reporting of births, the model Law for the Registration of Births, is on the statute books of a number of states. Where it is not, the first step to be taken is to have this law enacted. This would apply to the following states: Alabama, Arizona, Colorado, Delaware, Iowa, Indiana, New Mexico, Nevada, South Dakota, Oklahoma, Texas, and West Virginia. Wherever this law has been or will be enacted it must be enforced. The members of this association can be of the greatest service in this connection either as individuals or collectively to see that every birth in their communities is registered, that as physicians they do this themselves and that as citizens they uphold officials who insist on the fulfillment of the law and the exposure and arraignment of all violators.

In this campaign for the improvement of birth registration the organization with which I am connected desires to play its part. It is probably known to you that for a period of two years, the Metropolitan Life Insurance Company has been

engaged in distributing through its agency force thousands of mailing cards, for the purpose of registering births. These cards are addressed to the health officers and registrars of states and cities and are distributed by agents in the homes of policy-holders where there has been a recent birth or where a birth is expected. The mother is directed to fill in the name and date of birth of the child and her own name and address and then to mail the card. As an inducement to the mother to fill out and mail the card, it calls on the health officer to send literature on child hygiene. The form of the card used is shown below.

Metropolitan Life Insurance Company Stat. Form 6 Feb. 1915

NEW YORK

The Health Officer, ...191.....
(DATE)

Dear Sir:

My baby..... .....
(NAME)

was born on.....191.....
(MONTH) (DAY)

at.....
(NUMBER) (STREET) (CITY)

Please send me your literature on how to keep my baby well.

.....
(PARENT)

The Metropolitan Life Insurance Company takes this means to improve birth registration and to further infant hygiene.

The plan has proved of assistance to many state and municipal health officers. Besides enabling them to register births which otherwise would have escaped official registration, it has, by singling out those who persistently fail in complying with the requirements of the law, given them at least a partial check on delinquent physicians and midwives. If these individuals were followed up with prosecutions and fines, as Dr. Wilbur planned to do in New York State, the number of violations of the law would rapidly be reduced. We have received many communications from registrars all over the country testifying to the aid they have received through our coöperation. I am

in a position, at this time, to offer you a more extensive development of this plan. If health officers and other persons interested in the reduction of infant mortality in the several states and cities of the country will write to us, we will see that an adequate supply of the cards is distributed to our policyholders. We will, moreover, follow up this distribution to see that the interest of our field staff is maintained. We are convinced of the efficacy of the plan in improving birth registration.

It is certainly to be hoped that those interested in reducing infant mortality in American cities will concentrate their attention on the problem of birth registration. At the present time we cannot measure with any degree of accuracy, except in a few cities, the effectiveness of our program for the reduction of infant mortality. Too much, as we have seen, is taken for granted and credit is appropriated beyond measure for reductions in infant mortality that are much greater than actually have occurred. We should remove, for all time, the handicap which mars the entire field of our work. Our campaign for the next few years is clearly marked out. We should work to establish a Registration Area for Births which shall be nationwide and as accurate as it is extensive.

APPENDIX A.

REGISTERED BIRTHS AND BIRTH RATES RETURNED BY 144 CITIES IN UNITED STATES 1910, 1914, AND 1915.

City.	Number of Births.			Birth Rate per 1,000 Population.		
	1910.	1914.	1915.	1910.	1914.	1915.
Birmingham, Ala.	2,777	3,046	3,040	20.7	18.3	17.5
Mobile	1,058	1,178	1,086	20.5	21.2	19.2
Alameda, Cal.	353	414	442	16.3	15.7	16.4
Los Angeles	5,476	8,308	7,925	16.9	18.9	16.7
Riverside	260	306	278	16.9	16.7	14.6
San Diego	472	1,114	1,045	11.8	22.8	20.4
San Francisco	6,435	7,308	7,649	15.4	16.3	16.8
Santa Cruz	134	162	153	11.9	12.0	10.9
Stockton	189	436	554	8.1	17.0	16.1
Colorado Springs, Colo.	457	432	467	15.6	13.6	14.4
Bridgeport, Conn.	2,984	3,763	3,908	29.1	32.6	33.0
Naugatuck	359	325	361	28.1	23.8	26.0
New Britain	1,607	1,946	1,964	36.3	38.4	37.6
New London	485	617	680	24.6	30.0	32.7
Wilmington, Del.	2,082	2,500	2,600	23.8	27.2	27.9
Washington, D. C.	7,031	7,130	7,067	21.2	20.2	19.7
Jacksonville, Fla.	1,020	1,871	1,688	17.5	26.7	23.1
Savannah, Ga.	1,722	1,744	1,721	26.4	25.7	25.2
Chicago, Ill. (a)	24,368	51,993	51,703	11.1	21.7	21.1
Quincy	879	849	1,000	24.0	23.1	27.2
East Chicago, Ind.	422	1,215	1,145	21.7	47.1	42.1
Fort Wayne	978	1,749	1,564	15.2	24.2	21.0
Hammond	415	824	820	19.7	33.7	32.4
Indianapolis	4,683	5,664	5,417	19.9	21.8	20.4
Logansport	387	406	439	20.3	20.0	21.2
South Bend	1,665	1,906	1,796	30.8	29.3	26.8
Baltimore, Md.	9,858	12,637	13,634	17.6	21.8	23.3
Cumberland	537	709	711	24.5	29.7	27.8
Adams, Mass.	431	484	438	33.0	35.0	31.2
Attleborough Town	426	490	489	26.1	26.8	26.0
Boston	17,670	19,462	19,655	25.7	26.5	26.4
Chicopee	912	1,208	1,207	35.7	43.1	42.7
Haverhill	1,050	1,169	1,214	23.7	24.8	25.4
Lowell	2,650	2,934	2,964	24.9	26.4	26.4
Lynn	2,403	2,186	2,220	26.8	22.3	22.1
Melrose	312	333	354	19.8	19.7	20.6
New Bedford	3,973	3,731	3,673	40.8	33.5	32.0
Newburyport	321	334	367	21.5	22.1	24.2
Newton	826	870	903	20.7	20.5	21.0
Peabody	406	529	588	25.7	30.2	32.8
Quincy	949	1,083	1,075	28.9	29.8	28.9
Revere	462	714	772	25.1	33.1	34.6
Salem	1,260	1,187	1,046	28.7	25.3	21.9
Springfield	2,656	3,226	3,375	29.7	32.1	32.7
Wakefield	276	330	325	24.1	26.8	26.0
Watertown	385	481	500	29.7	33.8	34.4
Webster	404	414	362	34.9	32.7	28.0
Winthrop	181	232	218	17.7	19.6	17.8
Woburn	351	360	369	22.9	22.8	23.3
Worcester	4,060	4,855	4,691	27.7	30.8	29.2
Alpena, Mich.	237	254	215	18.6	19.4	16.3
Detroit	11,509	19,164	20,917	24.5	35.6	37.7
Grand Rapids	2,788	3,205	3,281	24.7	26.0	26.1
Ironwood	478	502	522	37.1	35.5	36.1
Kalamazoo	805	1,022	910	20.2	22.3	19.2
Muskegon	617	716	780	25.6	28.1	30.3
Pontiac	284	453	402	19.4	27.4	23.6
Sault Ste. Marie	353	430	359	27.9	31.9	26.2
Duluth, Minn.	1,877	2,080	2,170	23.8	23.3	23.6
Minneapolis	5,985	7,889	7,813	19.7	23.0	22.1

(a) The number of registered births in Chicago is estimated as 95 per cent. of the returns from Cook County. (See Bulletin 112 of Bureau of the Census, Mortality Statistics for 1911, p. 24, footnote 4.)

APPENDIX A—*Continued.*

REGISTERED BIRTHS AND BIRTH RATES RETURNED BY 144 CITIES IN UNITED STATES 1910, 1914, AND 1915.

City.	Number of Births.			Birth Rate per 1,000 Population.		
	1910.	1914.	1915.	1910.	1914.	1915.
St. Paul	3,964	5,195	5,290	18.4	21.9	21.9
Virginia	376	550	488	35.4	40.2	33.8
St. Louis, Mo. (a)	15,663	15,306	15,018	22.7	20.8	20.1
Helena, Mont.	304	383	334	24.2	28.9	24.9
Missoula	242	321	281	18.5	19.5	16.2
Lincoln, Neb.	1,034	1,207	1,169	23.4	26.4	25.4
Berlin, N. H.	470	465	466	39.7	35.7	35.0
Concord	399	402	409	18.5	18.0	18.2
Dover	316	242	314	23.9	18.2	23.7
Laconia	225	270	271	22.0	24.3	24.0
Manchester	2,029	2,242	2,370	28.8	29.6	30.8
Nashua	677	707	719	26.0	26.3	26.5
Asbury Park, N. J.	210	190	222	20.4	14.9	16.6
Bayonne	1,745	2,064	2,287	31.1	31.6	33.8
Camden	1,958	2,444	2,484	20.6	23.9	23.8
East Orange	582	569	784	16.8	14.3	19.0
Elizabeth	1,540	2,196	2,109	20.9	26.6	24.9
Jersey City	4,567	7,258	7,085	17.0	24.7	23.6
Kearney	365	442	486	19.4	20.1	21.4
Montclair	436	491	523	20.1	19.8	20.5
Morristown	250	258	271	19.9	19.8	20.6
Newark	10,289	11,478	11,248	29.4	29.5	28.2
Orange	788	796	791	26.5	24.9	24.3
Passaic	2,040	2,048	1,988	36.9	30.9	28.8
Plainfield	497	569	644	24.1	25.0	27.7
Trenton	1,538	3,327	3,059	15.8	31.1	28.0
West New York	342	597	638	24.9	34.9	35.6
Buffalo, N. Y.	10,008	12,612	12,683	23.5	27.8	27.5
Cortland	265	228	295	22.9	18.1	23.0
Dunkirk	583	569	522	33.6	29.0	25.9
Hornell	227	295	288	16.6	20.6	19.8
Hudson	254	289	377	22.2	23.6	30.1
Little Falls	352	429	488	28.6	32.8	36.8
New York	129,080	140,647	141,256	26.9	26.4	25.8
Niagara Falls	879	1,517	1,434	28.7	43.2	39.6
North Tonawanda	363	419	406	30.2	31.8	30.1
Plattsburg	219	239	227	19.6	19.4	18.1
Saratoga Springs	222	254	266	17.5	19.8	19.3
Schenectady	2,172	2,361	2,165	29.5	26.1	22.7
Syracuse	2,870	3,415	3,579	20.8	22.9	23.5
White Plains	366	545	520	22.7	28.1	25.8
Yonkers	2,107	2,543	2,461	26.2	27.2	25.5
Raleigh, N. C.	463	604	556	24.1	30.5	27.8
Canton, Ohio	1,123	1,278	1,491	22.2	22.3	25.2
Cincinnati	7,263	8,080	7,803	19.9	20.1	19.2
Columbus	3,280	3,837	3,896	18.0	18.8	18.6
Dayton	2,637	2,950	2,697	22.6	23.8	21.5
Massillon	285	278	299	20.5	18.6	19.8
Middletown	306	558	602	23.1	37.6	39.5
Norwood	268	316	247	16.4	15.6	11.6
Sandusky	395	425	418	19.8	21.0	20.7
Toledo	3,542	4,460	4,551	20.9	24.2	24.2
Youngstown	1,694	2,109	2,558	21.2	22.6	24.5
Altoona, Penn.	1,410	1,599	1,525	26.9	28.3	26.5
Carbondale	479	467	446	28.0	25.2	23.6
Erie	1,791	2,300	2,090	26.8	31.8	28.3
Harrisburg	1,634	1,442	1,352	25.4	20.8	19.1
Norristown	571	665	672	20.4	22.0	21.8
Philadelphia	38,676	41,063	40,849	24.9	24.8	24.3
Pittsburgh	15,197	16,328	16,139	28.4	28.9	28.2

(a) April to April.

APPENDIX A—*Concluded.*

REGISTERED BIRTHS AND BIRTH RATES RETURNED BY 144 CITIES IN UNITED STATES 1910, 1914, AND 1915.

City.	Number of Births.			Birth Rate per 1,000 Population.		
	1910.	1914.	1915.	1910.	1914.	1915.
Reading	2,496	2,670	2,511	25.9	25.8	23.3
Sunbury	328	377	335	23.7	24.4	21.1
Warren (a)	230	269	297	20.6	19.2	20.6
Pawtucket, R. I.	1,183	1,278	1,419	22.8	22.5	24.4
Providence	5,727	6,098	5,833	25.4	24.9	23.3
Nashville, Tenn.	1,669	2,369	2,095	15.1	20.6	18.1
Galveston, Tex.	685	911	940	18.4	22.6	22.9
Ogden, Utah	258	880	779	10.0	29.8	25.6
Barre, Vt.	247	285	275	22.9	24.3	23.0
Rutland	258	302	322	19.0	20.9	22.0
Richmond, Va.	2,734	3,155	3,473	21.4	23.4	22.5
Seattle, Wash.	4,220	4,905	4,953	17.5	15.7	15.0
Tacoma	1,517	1,546	1,487	17.9	14.9	13.8
Wheeling, W. Va.	634	830	840	15.2	19.4	19.5
Beloit, Wis.	353	415	408	23.2	24.2	23.2
Fond du Lac	431	438	458	22.8	21.5	22.1
Janesville	274	285	287	19.7	20.1	20.1
La Crosse	629	720	621	20.7	23.0	19.7
Madison	217	757	673	8.5	25.7	22.4
Manitowoc	324	296	373	24.8	21.8	27.3
Milwaukee	9,797	11,929	11,278	26.1	28.6	26.3
Oshkosh	750	820	794	22.6	23.4	22.3
Racine	964	1,258	1,350	25.2	28.3	29.7
Superior	719	868	780	17.7	19.6	17.2
Total Cities	466,894	563,678	564,518	22.6	24.7	24.2

(a) Stillbirths included.

PROCEEDINGS OF THE SEVENTY-EIGHTH ANNUAL MEETING OF THE AMERICAN STATISTICAL ASSOCIATION, COLUMBUS, OHIO, DECEMBER 27–29, 1916.

The seventy-eighth annual meeting of the American Statistical Association was held at Columbus, Ohio, December 27–29, 1916.

PROGRAM.

WEDNESDAY, DECEMBER 27.

8.00 p. m. First Session, Banquet Hall, Hotel Deshler.

Joint meeting of all the Associations.

Presiding, William Oxley Thompson, of the Ohio State University.

Addresses by the Presidents:

"The National Point of View in Economics," Thomas N. Carver, American Economic Association.

"Countryside and Nation," George E. Vincent, American Sociological Society.

"Opportunities for Practical Work by the Statistical Association," Charles P. Neill, American Statistical Association.

"The Need for Health Insurance," Irving Fisher, American Association for Labor Legislation.

THURSDAY, DECEMBER 28.

10.00 a. m. Second Session, Chapel, First Congregational Church.

1. "Comparative International Statistics," Royal Meeker, U. S. Bureau of Labor Statistics.
2. "Utilization of Statistics in Business," Julius H. Parmelee, Bureau of Railway Economics.
3. "The Increasing Mortality After 45,—Some Causes and Explanations," Louis I. Dublin, Metropolitan Life Insurance Co.

Discussion.

2.30 p. m. Third Session, Chapel, First Congregational Church.

Business Meeting.

10.00 p. m. Smoker, Hotel Deshler.

FRIDAY, DECEMBER 29.

10.00 a. m. Fourth Session, Room 106, General Library Building, Ohio State University.

Joint meeting with the American Economic Association.

"Do the Statistics Regarding the Concentration of Wealth in the United States Mean What They Are Commonly Assumed to,

Mean?" Allyn A. Young, Cornell University; Willford I. King, University of Wisconsin.

Discussion: Davis R. Dewey, Massachusetts Institute of Technology; George P. Watkins, Public Service Commission, N. Y. City.

Discussion from the floor under the five-minute rule.

1.00 p. m. A complimentary luncheon by the Ohio State University.

6.30 p. m. Banquet at the Athletic Club, on Broad Street, followed by a discussion of a number of special problems likely to arise at the close of the European War.

Minutes of the Business Meeting.

Meeting called to order at 2.30 p. m., Professor Carl J. West presiding.

The reading of the minutes of the previous annual meeting was dispensed with as they had been published in the Quarterly Publications of the Association.

The Secretary presented the following report:

Secretary's Report.

Mr. Chairman and Members of the Association:

I have the following to report in regard to the condition of the Association:

Membership December 29, 1915, date of last annual meeting	683
New members added	98
Deaths during the year	6
Resignations	22
Dropped	54
Total deductions	82
Present membership	699
Net gain	16
Beside members we have:	
Subscribers (mostly libraries)	215
Domestic Exchanges	40
Foreign Exchanges	117
Total mailing list	1,071

The death of the following members has been reported during the year: E. L. R. Gould, Theodore L. Keppler, E. P. Marshall, W. J. Montgomery, James P. Tolman, Robert G. Valentine.

Four regular numbers of the QUARTERLY PUBLICATIONS have been issued during the year, containing an aggregate of 470 pages, or an average of 118 pages, per number.

Only two meetings of the Association have been held during the year; both of these were held in New York City, on May 5 and December 14, respectively. These meetings took the form of a dinner, followed by round-table discussion. The average attendance was about 50.

It is noteworthy that there has been a marked increase in the Association's membership in New York City in recent years, especially since quarterly meetings have been held there rather regularly. It is to be hoped that the members in other large cities will find it worth while to follow the excellent example of our New York members.

Respectfully submitted,

CARROLL W. DOTEN,
Secretary.

On motion, it was voted to accept the report of the Secretary and to authorize its publication in the proceedings in the March number of the QUARTERLY PUBLICATIONS.

TREASURER'S REPORT.

December 23, 1915, to December 22, 1916.

RECEIPTS.

Membership dues	$1,372.15	
Sales and subscriptions	583.96	
Dividends and interest	159.68	
Balance on hand, December 23, 1915	850.97	
		$2,966.76

EXPENDITURES.

Printing	$1,536.36	
Postage	217.88	
Salaries and clerical service	578.46	
Expenses	47.99	
	$2,380.69	
Balance on hand, December 22, 1916	586.07	
		$2,966.76

ASSETS.

17 shares B. & A. R. R. stock.

S. B. PEARMAIN,
Treasurer.

AUDITORS' REPORT.

We have audited the accounts of the treasurer of the American Statistical Association, for the year ending December 22, 1916, and counted the securities in his possession. We find the accounts accurately stated and the expenditures properly vouched.

Respectfully submitted,
MARTIN J. SHUGRUE,
ERNEST H. GAUNT,
Auditing Committee.

SEVENTY-FIFTH ANNIVERSARY FUND.

To December 22, 1916.

RECEIPTS.

Cash on hand Jan. 1, 1916.....		$169.36

EXPENDITURES.

July 6. Paid John Koren.....	$87.55	
Nov. 15. Paid John Koren.....	43.75	
Balance on hand December 22, 1916...	38.06	
		$169.36

S. B. PEARMAIN,
Treasurer.

AUDITORS' REPORT.

We have audited the Anniversary Fund accounts of the treasurer of the American Statistical Association for the year ending December 22, 1916, and find the statements correct and the expenditures properly vouched.

Respectfully submitted,
MARTIN J. SHUGRUE,
ERNEST H. GAUNT,
Auditing Committee.

On motion, it was voted to accept the reports of the treasurer and the auditors, and to publish them in the proceedings of the meeting.

The report of the Nominating Committee, consisting of W. Z. Ripley, W. S. Gifford, and Fred C. Croxton, which had been sent to the members of the Association thirty days prior to the meeting, in accordance with the provisions of the constitution, was then taken up for action. No other nominations having been made by petition, it was voted to instruct the secretary to cast one ballot for the following persons placed in nomination by the committee: President, Allyn A. Young; vice-presidents, Charles F. Gettemy, Joseph A. Hill, Charles H. Verrill; counsellors, John Koren, E. Dana Durand, Wesley C. Mitchell; treasurer, S. B. Pearmain; secretary, Carroll W. Doten; librarian, Horace G. Wadlin; editor, William B. Bailey. This vote having been cast they were duly declared elected.

Report of Library Committee.

The Library Committee has ascertained with care the existing condition of the Association library, and wishes to make this condition a matter of record by reporting it in full to the Association at this time.

It appears that when the Statistical Association turned its collection of books, pamphlets, and serials over to the Boston Public Library, the transfer took the form of an outright gift. The only condition named was that "the purely statistical portion of the library should be kept together, and members of the Association should have free access to the shelves of the collection." These conditions having been clearly met, it would seem that the gift still stands and that the Association is essentially without any library of its own!

The collection originally transferred numbered about 5,000 books and pamphlets. Some of these were duplicates of copies already in the Public Library. With the consent of the Association these duplicates were eliminated. From material already in the Library, transfers were made to the shelves of the Statistical Department, so that at the end of the year 1903 the Statistical collection numbered 10,756 bound vol-

umes. Since that year, additions have been made from three sources: First, gifts transmitted through the Statistical Association; second, exchange of the Association's publications; and third, direct purchase by the Public Library. Upon the average about 875 bound volumes have been shelved annually. Slightly more than half of these appear to have come to the Library through the Association or by direct gift.

It should be noted that not all the books in the collection are distinctly statistical. Works in economics, sociology, and allied subjects are included as a general rule. The Library's policy seems to be to hold within the Statistical Department all books and pamphlets dealing with subjects within the limits of social science. The complete collection numbers today about 20,000 bound volumes.

The collection has been quartered from the first in one of the separate rooms in the rear of the Public Library building. Stacks close beside the tables and in balconies overhead place the books within easy access. But lighting conditions within the room are not what they should be, and the general appearance of the quarters is unattractive. Yet there seems to be no prospect of a better housing of the collection. Naturally a Statistical Department cannot claim either the first attention or best accommodation of a general public library.

Such, then, is the present status of what *used to be* the Association's library. We find ourselves quite unable at this time to frame any definite recommendations looking toward action by the Association.

ROGER W. BABSON, *Chairman.*

After some discussion it was voted that the Library Committee be empowered, after consultation with the authorities of the Boston Public Library, to discontinue any domestic or foreign exchange that is not being utilized by the Library, or to deposit such exchanges in some other library, at the discretion of the committee.

It was further voted to inform the authorities of the Boston Public Library that there is some dissatisfaction on the part of the members of our Association with the way in which the library of this Association, which was placed in their care

some years ago, has been utilized by them, and that the Association would be glad to consider the matter of making some other disposition of this collection, in whole or in part, if the trustees are unable to meet our request for more nearly adequate care and a more favorable location for these books and publications.

The report of the Standing Committee on Business Statistics was made by Julius H. Parmelee in the absence of the chairman, W. S. Gifford.

It was moved and carried that the report of this committee be accepted, that the committee be commended for the preliminary bibliography which it has prepared, and that the committee be empowered to continue its work with a view to ultimate publication.

It was voted on motion that the Standing Committee on Federal Statistics be instructed to coöperate with the committees of other organizations in making suggestions to or otherwise assisting the Bureau of the Census in its preparation for the next decennial census.

It was moved and carried that the selection of the place and time for holding the next annual meeting be left with the Board of Directors.

The following resolution presented by Edwin W. Kopf was adopted by unanimous vote:

RESOLUTION.

WHEREAS, The present appropriation law covering expenditures in the several executive departments of the United States Government specially states that no part of the money appropriated shall be expended for paying the expenses of officials or other employees while in attendance at conferences, conventions, or meetings of associations, and

WHEREAS, It is frequently of mutual advantage to the Government and to scientific associations interested in the work of the departments that there shall be at such gatherings free interchanges of views in matters that concern each, and

WHEREAS, The present restriction makes for the curtailing or entire absence of departmental representation at the con-

ferences, conventions, or meetings of such associations to the detriment of the public good, be it therefore

Resolved, by the American Statistical Association in annual meeting assembled at Columbus, Ohio, December 28, 1916, That it is the sense of the Association that, whenever in the discretion of the heads of the Government departments or bureaus concerned, it will be to the public interest to send representatives to such conferences, meetings, or conventions, a sufficient amount of the sum appropriated for the maintenance of such departments or bureaus should be available to cover the expenses of such representatives for travel and subsistence during absence from Washington, and be it further

Resolved, That it is the sense of the American Statistical Association that the provision of the present appropriation law which forbids the expenditure of money for the expenses of officials or employees in attendance upon the meetings of scientific associations should be stricken therefrom, and that the secretary be and hereby is instructed to forward copies of this resolution to the President of the Senate, the Speaker of the House, the chairman of the Committee on Finance, the chairman of the Appropriations Committee of the House, and the Secretary of Commerce.

No further business appearing, the meeting adjourned at 4.30 p. m.

CARROLL W. DOTEN,
Secretary.

REVIEWS AND NOTES.

The Social Survey, by Carol Aronovici, Ph.D. Philadelphia. The Harper Press. 1916. 255 pp.

This little book, one of the publications of the Bureau for Social Research of the Seybert Institution in Philadelphia, is a welcome addition to the growing literature upon this subject. The first chapter deals with the need of a survey and what may be expected to be accomplished by it. This opening section is, in some ways, the most valuable portion of the book because it was evidently written by one who knows what he is talking about. He recognizes the advantage of skilled assistance and the necessity of limiting a survey to those subjects in which there is some hope for improvement from an awakened public conscience. This section is filled with timely hints gained from experience. The remainder of the book is devoted, to a considerable extent, to schedules which may be used in the making of a survey. These relate to such topics as city planning, industry, health, leisure, education, crime, etc. Under each of these headings is given a list of the particular points upon which information may be expected to be collected. To purely statistical matter, only one section of five pages is devoted and much of this is taken from King's "Elements of Statistical Methods." This very brief reference is little better than nothing. The author excuses the brevity of this treatment on the ground that "All that could be justly expected is to point out the need for its use and refer the reader to the bibliography which gives a list of what are at this time considered the standard works on the statistical method in the hope that the surveying forces will venture into the study of some of these books prior to undertaking the task of tabulating, correlating, and interpreting the information gathered in the course of the survey."

One section of the book gives it such a value that most students of this subject will wish to see this volume in their library. This is a very complete and carefully prepared bibliography of some sixty pages. This is sub-divided under various headings and gives what is by all odds the best list of readings upon this subject which has been prepared up to the present. Taken as a whole, the book is an acceptable contribution to the literature of social problems in this country.

Wm. B. Bailey.

Yale University.

The Forty-Second Annual Report of the Orange Memorial Hospital for the Year 1915.

The annual report of the Orange Memorial Hospital is much like the reports of other hospitals in this country with the exception of the fact that Mr. Frederick L. Hoffman has prepared a statistical analysis of the

experience data of the hospital for the year 1915. This analysis enables the reader to gain some accurate information upon a number of points which are not apparent in the ordinary hospital report. The cases are distributed between white and colored and sub-divided according to sex and age. With the cases thus distributed a study is made of the results of the hospital treatment, whether the condition of the patients on discharge was cured, improved, unimproved, died, or not stated. When these distinctions are made it is apparent that the fatality rate was quite different for males than for females and for whites than for colored. The average duration of hospital treatment is also stated according to age and sex.

A further division of the inmates into private, free, or part pay patients is made and these are still further distributed according to the sections of the community from which they come. Although considerably more than half of the free and part pay inmates come from Orange, only about one fourth of the private and semi-private patients come from the same place, showing the advantage to East, West, and South Orange of having a hospital for private patients. This statistical analysis covers but five pages and yet it gives just the information which is often sought in vain concerning the activities of a hospital of this nature. It is to be hoped that other hospitals may be led to include a similar analysis in future reports.

W. B. B.

Select Discussions of Race Problems. A Collection of Papers of Especial Use in the Study of Negro American Problems. Edited by J. A. Bigham. 108 pp. Atlanta University Press. 1916. Price 50 cents.

The first few pages of this pamphlet contain the Proceedings of the Twentieth Annual Conference for Study of Negro Problems. The rest of the volume consists of a number of reprints of articles by well known writers, which have appeared in various publications. The subject-matter of these papers is the physical and mental bases of race distinction, and particularly the question of the superiority or inferiority of races as compared with each other. The particular trend of all the articles is to emphasize the conclusion that no tangible evidence of the inherent racial inferiority of the Negro to the white man, in mind or body, has yet been established. It is obvious that the discussions have been "selected" with this in view, and that therefore the pamphlet, while containing much that is interesting and valuable, is, as a whole, entirely lacking in critical or scientific value.

H. P. Fairchild.

Yale University.

SOME STATISTICS RELATING TO BIRTHS IN SOUTH DAKOTA.

The published vital statistics of South Dakota, 1909 to 1913, inclusive, divide the mothers of a given year into two classes according as they give birth in the year to sons or to daughters. Each of these two classes is arranged with respect to increasing age. The same arrangement is followed with respect to the fathers.

The two tables below give some results deduced from these statistics. Ms and Md are abbreviations for mothers of sons and mothers of daughters, respectively. Similarly, for Fs and Fd. The columns headed D and S give the standard deviation and the skewness. The latter is computed with respect to the actual maximum. The column under R gives the range, or the number of years over which births occurred.

The tables are based on more than 63,000 births and covers all the cases for which the appropriate data have been published.

MOTHERS.

Year.	Av. Age Ms.	Av. Age Md.	D. Ms.	D. Md.	S. Ms.	S. Md.	R. Ms.	R. Md.
1909	27.9	28.3	6.32	6.37	0.62	0.52	34	35
1910	28.5	28.3	6.44	6.45	0.70	0.51	43	40
1911	27.8	28.1	6.36	6.35	0.44	0.64	39	27
1912	28.3	28.3	6.57	6.36	0.35	0.36	39	35
1913	28.2	28.3	6.28	6.37	0.67	0.68	35	36
Mean	*28.14*	*28.26*	*6.41*	*6.41*	*0.65*	*0.67*		

FATHERS.

Year.	Fs.	Fd.	Fs.	Fd.	Fs.	Fd.	Fs.	Fd.
1909	33.2	33.2	7.66	7.83	0.42	0.41	52	52
1910	33.1	34.4	7.72	8.01	0.40	0.42	46	55
1911	33.1	32.9	7.72	7.93	0.40	0.37	56	56
1912	33.3	32.3	7.74	7.75	0.41	0.41	60	52
1913	33.3	32.7	7.60	7.69	0.43	0.35	52	46
Mean	*33.2*	*33.1*	*7.69*	*7.84*	*0.412*	*0.392*		

As a partial restatement of the results in the tables we give the following:

In South Dakota, in the years 1909 to 1913, inclusive, the mothers giving birth to daughters showed less variability in age, in the distribution of age with respect to the yearly average and in the assymmetry of their distribution than did mothers giving birth to sons.

In South Dakota, in the years 1909 to 1913, inclusive, the fathers of sons born in this period were less variable in average age, in the distribution of ages with respect to the yearly average, and in the assymmetry of this distribution than did the fathers of daughters.

Taking the entire period into consideration the average age of mothers of daughters differs less from that of the fathers than does the average age of the mothers of sons differ from that of the fathers.

The average age of the mothers of daughters is greater than that of the mothers of sons and the average age of the fathers of daughters is less than that of the fathers of sons.

T. E. M.

Vermilion, S. D.

"THE HOMICIDE RECORD OF AMERICAN CITIES FOR 1915," THE SPECTATOR, DECEMBER 21, 1916. F. L. HOFFMAN.

Many agencies, both public and private, are indebted to Mr. Hoffman for his annual review of the homicide record in American cities. There is no other source to which one may resort for a general compilation and analysis of statistics relating to this particular crime. True, the Division of Vital Statistics of the United States Census Bureau keeps a record of mortality data throughout the registration area of the United States, but this division is considering homicide merely as one of the many causes of deaths and not as a crime. Mr. Hoffman has used these data as a basis for a study of the amount of homicide considered as a crime. That the only effort to present this branch of criminal statistics for the country as a whole is left to be undertaken year after year by a single individual in unofficial life is no less a tribute to Mr. Hoffman than it is a condemnation of the various agencies of government which should be concerned with accumulating and interpreting this information. It is to be hoped that while Mr. Hoffman continues to fill the breach, by his presentation of this branch of criminal statistics, a stimulus may be given to other agencies, particularly governmental, to appreciate the value of such record information, and to undertake the preparation of this and other branches of criminal statistics on a comprehensive scale.

Mr. Hoffman has used the scattered returns of prison statistics prepared by the Census Bureau and the mortality returns of the Division of Vital Statistics of the Census Bureau and of municipal departments of health. The prison statistics of 1890 and 1910 relate to a point of time, showing the number of prisoners in confinement on a given day. But while the statistics of these enumerations speak a point of time, they really deal with a period of time, since the prisoners were brought into confinement on separate occasions, ranging over a long period. This period is indefinite and unknown. The Census Bureau investigation of June 1, 1890, shows that there were 7,386 prisoners in the United States charged with homicide, or 9 per cent. of the total number of prisoners under confinement; and again, a census return of January 1, 1910, shows 6,904 prisoners who were charged with first degree homicide, and 7,412 for second degree homicide, making a total of 14,316. By preparing a population ratio, Mr. Hoffman shows that the number of prisoners held on these charges was 156 per 1,000,000 inhabitants in 1910, as against 117 per 1,000,000 in 1890. On this basis the assumption is made that "in the direction of the security of the person there has been decided retrogression." For the purpose of

determining the amount and nature of this particular phase of criminality, the value of these totals becomes extremely doubtful, since the figures are acquired as of a point of time yet applying to many periods of time, which range from one day to twenty years or over, according to the length of time the prisoner has served his sentence. Moreover, the probability is strong that a number of the prisoners charged with homicide, involving life sentences, or twenty-year terms, who were counted in the enumeration of June 1, 1890, were counted again in January 1, 1910. The per centum calculation of the proportion of prisoners charged with homicide to the total number of prisoners is likewise misleading. To say that in 1910, 10.5 per cent. of the total number of prisoners, as against 9 per cent. in 1890, were charged with homicide makes it appear that one tenth of all persons convicted had committed homicide. It must be pointed out that the persons imprisoned on a charge imposing long sentences have been accumulating throughout the years of a long period of time, whereas there are many charged with lesser offenses, such as burglary, grand larceny, etc., who have been imprisoned during the same period, and whose terms have expired before the day on which the enumeration was made.

The prison statistics are used only to point the general status of homicide —mortality returns are used as the "most trustworthy" data on the subject of homicide. The point is indeed well taken that there is a very appreciable difference between the number of victims of homicide and the number of persons convicted of homicide. For this reason, mortality statistics are better than judicial statistics in assessing the total amount of homicide criminality. Mortality data are reliable since a death is a non-varying unit, but after all, mortality statistics are not crime statistics, and the chief consideration of a homicidal death should be its criminal aspect. A study of homicide as a crime must take into account other elements than the victim and the manner of inducing death. The perpetrator of a homicide is the most important factor. The motive of the crime is perhaps more important than the manner of commission. Then there are several degrees of homicide that must be reckoned with. Since judicial statistics do not include all the crimes committed, and mortality statistics do not include all the facts essential to a study of homicide as a phase of criminality, there is imperative need that we look for some other source that will meet all the requirements. It is possible that judicial statistics can be improved to the extent that they include the elements now lacking. It may be well here to point out the possibilities of police statistics. The police department is an agency which must take account of all homicides that are committed within its jurisdiction, and record the data relating to both victim and perpetrator, the manner of commission and the motive. Finally, the police are also concerned with the judicial phase of cases in which arrests and indictments are made. Considerable progress has already been made by some police departments in this connection, notably New York and St. Louis.

The conclusion that the single case of murder of a commissioner of banking by bank officials "is of special interest as emphasizing the lament-

able fact that the homicidal impulse is not by any means limited to the lower classes or to foreigners of recent immigration to this country," while correct as far as absolute limitation goes is not sufficiently supported by facts to admit of the conclusion implied. A comprehensive study of the perpetrators of homicide is needed to support intelligent conclusions as to what racial or social groups are responsible for murders and manslaughters. It is necessary to make such an analysis according to cities and other areas in much the same way that the mortality data has been considered. Such a study would doubtless show that the Negro is not alone the victim of homicide in the South, as Mr. Hoffman points out, but that he is also the perpetrator, and responsible for a disproportionate number of homicides, according to the Negro population, in certain Northern cities. For example, the police statistics of Chicago show that there were 33 Negro decedents and 32 Negro perpetrators in murder and manslaughter cases for the year 1915. In St. Louis there were, in 1915, 20 Negro decedents in murder and manslaughter cases and 24 perpetrators known to have been Negroes, out of a total of 71 decedents and 72 perpetrators. In Washington, D. C., in 1916, there were 18 colored decedents, as against 6 white, and 18 colored perpetrators, as against 5 white perpetrators.

There is some disparity in the figures for homicide which Mr. Hoffman presents in "Table V—Mortality From Homicide in Thirty-one American Cities, 1905–1915," and the figures for murder and manslaughter which I have obtained from the police departments of certain cities for the year 1915, as shown below.

	Mortality Table.	Police Records.
Memphis	125	75
St. Louis	103	74
Chicago	211	198
New York	258	247
New Orleans	185	71

The differences in Chicago, New York, and New Orleans may be accounted for in the fact that the mortality figures include abortions, while the police figures do not. This same fact may account for the difference of from 10 to 15 in St. Louis and Memphis. The remaining difference in the last named cities may be due to the fact that the mortality returns include homicidal deaths in city hospitals or other places in the city which resulted from crimes committed outside the limits of the city. The police figures deal with only those crimes committed within the city limits.

The tables showing the geographical incidence of homicide by states and cities are particularly illuminating. Altogether the work of Mr. Hoffman is very creditable and as accurate as can be expected under the present haphazard system employed in the United States in the reporting of homicides.

Raymond B. Fosdick.

New York City.

STATISTICS OF RELIGIOUS FAITHS IN NEW YORK CITY.

On Sunday, February 4, a body of 34,000 enumerators acting under the general direction of Mr. J. Shreve Dunham, ascertained the religious preferences of nearly three quarters of New York City's population. The city was districted and the information was secured through a thorough house to house campaign. The final program was approved at a meeting of priests, ministers, and rabbis representing the congregations of the several churches and religious societies in the city. Mr. Dunham will shortly go to Denver, Col., to conduct a similar campaign.

HISTORY OF THE FEDERAL REGISTRATION SERVICE.

In a monograph "The Federal Registration Service of the United States: Its Development, Problems, and Defects," Dr. Cressy L. Wilbur traces the work of the United States Government in vital statistics since the Seventh Census in 1850 and up to the close of the year 1915. The report pays particular attention to the continuous registration of deaths in specified areas since the "registration area for deaths" was established in 1880. Comprehensive tables and cartograms exhibit the main facts of the movement for satisfactory legislation and the enforcement of legislation. The section on "When and How Will the United States Obtain Complete Registration of Vital Statistics?" is practically a re-statement of Dr. Wilbur's prophetic conclusions in the paper which he read before the American Public Health Association at Denver, in 1895, and a summary of vital statistics progress of the last two decades. The document is issued by the Bureau of the Census, Washington, D. C.

NOMENCLATURE AND CLASSIFICATION OF CAUSES OF DEATH.

A Committee of the Vital Statistics Section of the American Public Health Association on the accuracy of certified causes of death has issued a summary of its conclusions following a detailed study of each title in the International List of Causes of Sickness and Death and of the terms included under such titles. The committee considered (a) the validity of the terms included under each title, *i. e.*, the probability that each term when reported as a cause of death represents the exact morbid condition covered by the title with which it is classified, and (b) the status of the term as descriptive of the *primary* cause of death. It was also the aim of the committee to separate the titles of the International List into two classes: (a) Those not to be accepted as reliable without autopsy or without specific supporting data upon which the diagnosis was based and (b) Those to be accepted as reliable without autopsy or other verification. The report of this committee is a further contribution to the critical literature on statistics of causes of death. Dr. Haven Emerson, Chairman, and Mr. George H. Van Buren, Executive Secretary, prepared the summary as published

by the United States Public Health Service under Reprint Number 363. A useful bibliography of this subject, including a reference to the Oertel-Bashford-Hoffman articles on the accuracy of cancer mortality statistics in the London *Lancet*, is to be found on p. 3 of Mr. F. L. Hoffman's "Mortality from Cancer Throughout the World."

STANDARDS IN STATISTICS OF INDUSTRIAL ACCIDENTS AND AN ADVANCE STEP IN THE CLASSIFICATION OF INDUSTRIES.

The Committee on Statistics and Compensation Insurance Cost of the International Association of Industrial Accident Boards and Commission has published its report as Bulletin 201, United States Bureau of Labor Statistics. A preliminary report had been previously published in the *Monthly Review* of the bureau for November, 1915. The classification of accident causes recognizes twelve main classes of the general subject. Each of these general classes is suitably partitioned in subordinate ranks. A supplementary classification of location and nature of injury and extent of disability and degree of partial disability is appended. The grouping of working machinery employed by the New York State Industrial Commission is published as Appendix A.

The classification of industries is a decided advance over any available since the publication of the United States Census Bureau Index to Occupations in 1910. In plans for the classification of occupations in the Census of 1920, the I. A. I. A. B. C. industry scheme will probably serve as a better base than the industry outline published in Volume IV, Thirteenth Census of the United States. The statistics published in that volume seem not to have taken the industry scheme of the 1910 Index and of the Bertillon-Vannacque International Statistical Institute List into account. For the purposes of most social statistics an industry classification of occupations is essential.

E. W. Kopf.

New York City.

Income Tax Procedure. By Robert H. Montgomery. The Ronald Press. New York. 1917. Pp. X, 461. $2.50 postpaid.

There is nothing statistical about this book, but in view of the fact that the American Statistical Association adopted a resolution at its annual meeting in 1914, calling upon the Bureau of Internal Revenue to so modify its income tax blank as to make it possible to obtain accurate statistics of incomes in this country, and in view of recent conferences between that bureau and a joint committee of this Association and the American Economic Association on this same matter, it may be well to direct the attention of statisticians to this work. The author disclaims any intention of presenting a complete digest of the income tax law. He says also that his

work is not a treatise or a history of the subject, though he does treat these aspects very briefly in a short historical chapter.

The real purpose of the book is to answer for the perplexed taxpayer a large number of questions which arise in his mind when he undertakes to make his returns. It explains the duties of those who must make returns, the kinds of income that are taxable, the various exemptions and deductions allowed, and the method of procedure in the matter of protests, overpayments, rebates, appeals, etc. All of this instruction and information is based upon a careful study of the rulings and decisions of the U. S. Treasury Department.

The book also contains chapters on state and municipal income taxes, the "Corporation Excise Tax," and the "Munitions Manufacturers' Tax."

The author has not, however, confined his efforts to description and exposition alone. He has not only pointed out the defects in the law and criticized its administration, but he has offered constructive suggestions for improvement in a number of instances.

It would have been an aid to the reader if the full text of the law had been printed in one place, even though it would have added somewhat to the size of the book, but this defect is not a serious one in view of the ease of obtaining official copies of the law.

On the whole the book is an acceptable and useful guide to the student as well as to the tax payer.

CARROLL W. DOTEN.

Massachusetts Institute of Technology.

Publications of the American Statistical Association.

The New Series of the Association, issued quarterly, will be sent to members of the Association on payment of the annual dues of two dollars. The subscription price is also two dollars per annum. Separate copies can also be purchased upon remittance of the advertised prices.

The following list of titles includes only the most important papers published in the several issues. There is in addition a considerable amount of miscellaneous material.

VOL. I. 1888-1889. Nos. 1-8. Pp. 492. PRICE $4.00.

No. 1. **Statistics of Water Power Employed in Manufacturing in the United States.** GEORGE F. SWAIN. 75 cents.

Nos. 2, 3. **Park Areas and Open-Air Spaces in American Cities.** E. R. L. GOULD.

Key to the Publications of the United States Census, 1790-1887; with Occasional References to Other Statistical Works. EDWARD CLARK LUNT. $1.00.

No. 4. **Life Insurance in the United States.** WALTER C. WRIGHT. $1.00.

No. 5. **Notes on the Statistical Determination of the Causes of Poverty.** AMOS G. WARNER. REMARKS. SAMUEL W. DIKE.

Statistics of Divorce in the United States and Europe. SAMUEL W. DIKE. 50 cents.

No. 6. **American Railroad Statistics.** ARTHUR T. HADLEY.

Statistics of Municipal Finance. HENRY B. GARDNER. 75 cents.

No. 7. **Prison Statistics of the United States for 1888.** ROLAND P. FALKNER. 50 cents.

No. 8. **Finance Statistics of the American Commonwealths.** EDWIN R. A. SELIGMAN.

Divorce in France. BENJAMIN F. KELLER.

Relief of the Poor in Germany. A. G. WARNER. $1.00.

VOL. II. 1890-1891. Nos. 9-16. Pp. 470. PRICE $4.00.

No. 9. **Mortgage Statistics.** GEORGE K. HOLMES. 50 cents.

No. 10. **The Study of Statistics in Italian Universities.** CARROLL D. WRIGHT.

Statistics of Private Corporations. ROLAND P. FALKNER. 50 cents.

Nos. 11, 12. **Statistics of the Colored Race in the United States.** FRANCIS A. WALKER.

How to Make Statistics Popular. CHARLES F. PIDGIN.

Retail Prices in Boston and Vicinity. WALTER F. COOK. $1.00.

No. 13. **The Growth of Cities in Massachusetts.** HORACE G. WADLIN.

Rate of Natural Increase of Population in United States. HERMAN HOLLERITH.

The First Census of Massachusetts. SAMUEL A. GREEN.

The Commercial Death Rate. ALBERT C. STEVENS. $1.00.

No. 14. **A Basis for Statistics of Cost of Production.** CARROLL D. WRIGHT.

A Formula for Predicting the Population of the United States. H. S. PRITCHETT.

Weight and Longevity. T. B. MACAULAY.

Some Results of Sanitary Legislation in England since 1875. GARY N. CALKINS. 75 cents.

No. 15. The Eleventh Census. R. P. PORTER.
Criminal Statistics. ROLAND P. FALKNER. 75 cents.

No. 16. The Census Enumeration in Prussia. CARL C. PLEHN.
A Plea for the Average. GEORGE K. HOLMES. 75 cents.

VOL. III. 1892-1893. Nos. 17-24. Pp. 614. PRICE $4.00.

No. 17. Statistics of Crime in Massachusetts. FRED G. PETTIGROVE.
Development of Statistics of Religions. M. FOURNIER DE FLAIX. TRANSLATED BY ALICE R. JACKSON.
Net Profits of Manufacturing Industries in the State of Massachusetts. FREDERICK B. HAWLEY.
Classification of Trade Statistics. FREDERICK C. HICKS. 75 cents.

Nos. 18, 19. A Statistical Inquiry concerning Domestic Service. LUCY M. SALMON.
The Theory and Practice of Price Statistics. R. P. FALKNER.
Measures of Distribution. GEORGE K. HOLMES.
Statistics of Suicides in New England. DAVIS R. DEWEY.
Semi-Annual Census of Paupers in Minnesota. H. H. HART.
75 cents.

No. 20. The Establishment of an Imperial Commission for Labor Statistics in Germany. CARL C. PLEHN.
French Statistical Publications. CHARLES D. HAZEN.
Sketch of Life of Robert W. Wood, M. D. JOHN WARD DEAN.
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